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CAUSES OF BLINDNESS AMONG RECIPIENTS OF AID TO THE BLIND

BY

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32

FOREWORD

Many of the constituent agencies of the Federal Security Agency—the Public Health Service, Office of Education, Office of Vocational Rehabilitation, and the Social Security Administration — are concerned with various aspects of the problem of blindness. This report on the causes of blindness of recipients of aid to the blind, prepared by the Bureau of Public Assistance of the Social Security Administration, points to the importance of concerted action by the various offices of the Federal Security Agency. These offices—cooperating with other public and voluntary agencies—can do much to further the prevention of blindness and the provision of adequate medical, rehabilitation, and welfare services for persons who are blind or threatened with visual loss. The report supplies a factual basis for more effective planning to reduce the extent of blindness, to minimize its handicapping effects, and to increase opportunities for useful and satisfying participation of visually handicapped persons in the national life.

Oscar R. Ewing

Federal Security Administrator

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PREFACE

The Bureau of Public Assistance of the Social Security Administration has responsibility for administering grants-in-aid to States for aid to the blind and for studying and making recommendations as to the most effective methods of providing for needy blind persons. State public assistance agencies likewise are concerned not only with providing assistance to persons who are blind but also with interpreting ways in which their needs may better be met and the amount of blindness reduced.

This report, analyzing the causes of blindness of nearly 21,000 recipients of aid to the blind in 20 States, raises fundamental questions concerning the scope of title X of the Social Security Act and the provision made by State public welfare agencies for blind persons and for needy persons with seriously impaired vision. Progress in meeting the special needs of blind persons requires the development of more adequate medical and welfare services. Of even greater importance is a more vigorous program for minimizing the amount of blindness in the future.

The report has been prepared by Ralph G. Hurlin, Ph. D., Sadie Saffian, and Carl E. Rice, M. D. Dr. Hurlin, who is Director of the Department of Statistics of the Russell Sage Foundation and Chairman of the Committee on Statistics of the Blind, is a consultant to the Bureau of Public Assistance. Miss Saffian is a member of the staff of the Bureau. Dr. Rice, formerly medical consultant on blindness to the Bureau, is a medical director in the United States Public Health Service and a diplomate of the American Board of Ophthalmology. Each of the authors participated in some phases of the planning and conduct of the study as well as in the preparation of the report. The study was carried on under the direction of Anne E. Geddes, Chief of the Statistics and Analysis Division of the Bureau.

The Bureau of Public Assistance is greatly indebted to the Russell Sage Foundation for making Dr. Hurlin's services available for work on the study. Despite other heavy commitments, both Dr. Hurlin and Dr. Rice have given generously of their time and skills.

Special recognition is due the State ophthalmologists in the 20 States participating in the study for their cooperation in classifying and reviewing the diagnostic information, to the State statisticians for the compilation of the State reports, and to these and other members of the State staffs who patiently and often at considerable inconvenience, answered many questions about the classifications assigned in particular cases.

We wish also to acknowledge the assistance of the late Dr. Kirby K. Bryant of the United States Public Health Service in making visits to several States for consultation concerning the classification of medical diagnoses.

Finally, the Bureau wishes to express its appreciation to the Committee on Statistics of the Blind for its pioneer work in developing the Standard Classification of Causes of Blindness, and in stimulating the recording of data concerning the causes of blindness. The Committee generously permitted the Social Security Board to reproduce its manual, as well as its plan of classification, in materials issued to State agencies participating in the study.

JANE M. HOEY,
Director, Bureau of Public Assistance.

June 1947.

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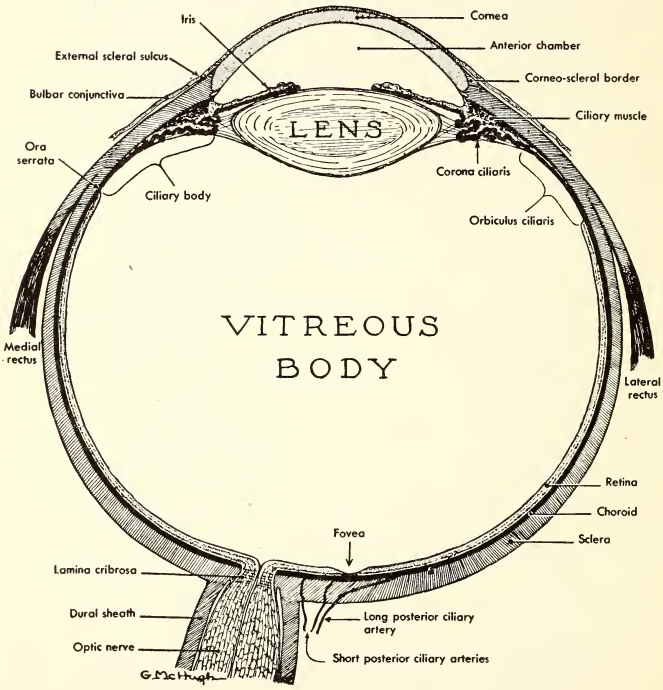
Chart 1.—*Horizontal section of a right eye (semidiagrammatic)*

[Drawing by Gladys McHugh, reproduced by permission of the publisher from *The Human Eye in Anatomical Transparencies*, by Peter C. Kronfeld, M.D., Gladys McHugh, and Stephen L. Polyak, M.D., Bausch and Lomb Press, Rochester, N. Y., 1943].



Chapter I.

INTRODUCTION

This report on the causes of blindness of recipients of aid to the blind analyzes information compiled from official reports of eye examinations by 20 State public assistance agencies during the prewar years 1940 and 1941.

Although analysis of the State data and the preparation of this publication have been delayed as a result of the war, the lapse of time has not materially impaired the significance of the information on causes of blindness. Progressive improvements in public health administration, in the prevention and treatment of disease, and in accident prevention are tending to reduce the amount of blindness resulting from some causes. Meanwhile other factors, of which by far the most important is the progressive aging of the population, are operating to increase blindness. The numerous influences that together determine the prevalence of blindness also bring about changes in the relative importance of different causes of loss of vision. The changes are reflected only gradually, however, in statistics of causes that relate to the blind population as a whole, because the annual increments to and decrements from the blind population are relatively small.

When the Social Security Act was passed in 1935 and the Bureau of Public Assistance of the Social Security Board[1] established policies and standards relating to the determination by State agencies of eligibility for aid to the blind, a foundation was laid for obtaining more accurate, detailed, and uniform statistics of the causes of blindness than had hitherto been available on a large scale. The Bureau of Public Assistance from the beginning of the program recommended to the States that they adopt a standard definition of blindness and that the fact of blindness be determined by ophthalmologists or physicians skilled in diseases of the eye. The Bureau also recommended that the physician's report of eye examination of all persons approved for aid to the blind contain a complete diagnosis of the cause of defective vision. The medical determination of blindness and the systematic and uniform recording of medical information on the records of eye examination have in many States produced a valuable new body of data relating to blindness.

To utilize this information, and thereby supply a basis for both State and national program planning and evaluation, a plan was formulated to enable the States to make comparable studies of the characteristics of recipients of aid to the blind and of the causes of their blindness. The data presented here were obtained as a result of this plan. The

[1] Although the Social Security Board became the Social Security Administration on July 16, 1946, the agency is referred to throughout this report as the Social Security Board because the data presented relate to the period before the Social Security Administration was established.

analysis of the data suggests that compilation by the States at intervals of several years of comparable information on the causes of blindness of recipients in relation to their characteristics could be of substantial value for administrative use in programs for aid to the needy blind and in prevention programs. Such compilation would also contribute to the development of statistical information concerning blindness.

For the purpose of this study, the term "blindness" means "economic blindness." Title X of the Social Security Act—under which Federal grants-in-aid have since 1936 been made to States with approved plans of aid to the blind—does not define blindness. The Bureau of Public Assistance, in promoting sound methods of administration of programs of aid to the blind, recommended to the States that they adopt, as a condition of eligibility for this form of aid, the concept of economic blindness; that is, loss of vision sufficient to cause inability to do effectively any kind of work, industrial or otherwise, for which sight is essential. The Bureau also recommended that a definition of economic blindness expressed in terms of ophthalmic measurements be adopted, and made the following suggestion:

> ". . . . central visual acuity of 20/200 or less in the better eye with correcting glasses is considered as economic blindness . . . . An individual with central visual acuity of more than 20/200 in the better eye with proper correction is usually not considered blind unless there is a field defect in which the peripheral field has contracted to such an extent that the widest diameter of visual field subtends an angular distance no greater than 20 degrees."[2]

This definition had the formal approval of the American Academy of Ophthalmology and Otolaryngology. It was based on the definition of economic blindness earlier adopted by the American Medical Association, which at the same time distinguished and defined such other grades of blindness as total blindness, vocational blindness, and educational blindness.[3] The recommended definition has been adopted either without change or with only minor modification by all the States represented in this study, as well as by most other States administering programs of aid to the blind.

Most of the important studies of the prevalence of blindness in the United States have used the concept of economic blindness. An exception is the national health survey, conducted by the United States Public Health Service in 1935-36, in which the concept of blindness used represented almost total blindness.[4]

The classification of causes of blindness used in this report is one

[1] *Instruction Regarding Procedure in Determining Blindness*, Bureau of Public Assistance, Social Security Board, 1936.

[2] Proceedings of the House of Delegates of the American Medical Association, the Eighty-fifth Annual Session held at Cleveland, Ohio, June 11–15, 1934, *Journal of the American Medical Association*, Vol. 102, No. 126 (June 30, 1934), p. 2205. The definition proposed by the Bureau of Public Assistance differed from the earlier American Medical Association definition by including the measurement 20/200 within the limit of economic blindness and by specifying the extent of visual field limitation that should be regarded as constituting disability equivalent to the specified limitation of central visual acuity.

[3] Britten, Rollo H., "Blindness, as Recorded in the National Health Survey — Amount, Causes, and Relation to Certain Social Factors," *Public Health Reports*, Vol. 56, No. 46 (Nov. 14, 1941), p. 2192.

developed by the Committee on Statistics of the Blind.[5] The committee first applied it to medical eye records of blind children and adolescents in residence and day schools for the blind in the school year 1933-34 and has continued its use for this purpose in succeeding years. The classification has also been used in studies made independently by several State agencies for the blind. Before this classification was developed, the infrequent reports of studies of the causes of visual loss among groups of blind people had varied widely in their schemes of classification. Therefore, satisfactory comparison or combination of their data was difficult or impossible. The Committee's classification plan has the advantage of distinguishing clearly between the eye affections, or conditions, that prevent or reduce vision and are therefore the immediate causes of blindness, and the etiologies, or underlying causes, of these conditions. It is also well adapted to the present general stage of development of ophthalmological diagnoses that are to be found in the records of eye examinations of recipients of aid to the blind.

It should be emphasized that medical records are essential as a source of adequate statistics of causes of blindness. For this reason, relatively little satisfactory information concerning causes of blindness can be obtained through general surveys of blind persons. The extensive compilations relating to causes of blindness made by the United States Bureau of the Census, as part of the decennial population censuses from 1890 through 1920, proved to be of doubtful value primarily because the information concerning causes was supplied by lay persons, who usually did not have accurate knowledge of the causes responsible for the reported blindness. In the census of 1930 the Bureau of the Census abandoned its effort to obtain information on causes of blindness in connection with the enumeration of blind persons, and in 1940 the attempt even to enumerate blind persons was discontinued.

In the National Health Survey of 1935-36, which produced much valuable information concerning the prevalence of blindness and the characteristics of blind persons, as well as some on the causes of blindness, the cause information was again based on statements of lay persons. On this account, only a small amount of information relating to causes could be included in the report of the survey.

Question naturally arises as to how representative of the blind population generally the present information on causes of blindness may be. The nearly 21,000 recipients of aid to the blind to whom the information relates comprised about one-fourth of the estimated total blind population of the 20 participating States (table 3). If the estimate is roughly accurate, therefore, the recipients studied constitute a relatively large, though not necessarily representative, sample of all blind persons in these States. Without accurate information

[5] A committee established in 1930 jointly by the American Foundation for the Blind and the National Society for the Prevention of Blindness. For further reference to the committee see page 37.

concerning the number, distribution, and characteristics of the general blind population of the country, there is no satisfactory basis for conclusions regarding the representativeness of these statistics on causes of blindness. Some basis does exist, however, for judgment in this respect, as is shown in following chapters.[6] This information may be briefly summarized.

The study population is known to have too few of both blind children and blind elders. This fact is demonstrated by knowledge of the State public assistance laws and administrative practices of public assistance agencies and by comparison with the results of the National Health Survey. Many State laws specify a minimum age, such as 18 or 21 years, for eligibility for aid to the blind, and some States give old-age assistance rather than aid to the blind to blind persons who have attained age 65. In some measure, at least, the effect on the tabulations of causes of the deficiency in the age distribution of the recipients can be estimated. An approximate adjustment has accordingly been made in the tables of the report in which causes are directly related to variation in the ages of recipients (appendix tables A-6 and A-11), and also in tables showing the distribution of all recipients by causes (tables 11 and 12 and appendix tables A-2 and A-8).

The selection of the participating States was accidental rather than planned. Although their regional distribution appears to be generally fortunate, the choice of these particular States may have led to unrepresentative results in some respects. To cite the most conspicuous example, it is likely that trachoma as a cause of blindness may be overemphasized in the study because of the number of so-called "trachoma-belt" States that participated.

The fact that all the blind persons studied are included in the category of the "needy" undoubtedly affects the representativeness of the results to a considerable extent. How much, it is not possible to say. Poverty is unquestionably a contributing factor in the occurrence of blindness. To the inability to purchase adequate medical care and the lack of sanitation imposed by poverty may still be traced the loss of vision of large numbers of blind persons. But blindness may lead to poverty as well as poverty to blindness. It seems probable that a large majority both of recipients of aid to the blind and also of the present general blind population of this country were self-sustaining before the onset of their blindness.

There appears to be some overweighting of men in the study population. Blind men are more likely than blind women to be dependent on assistance because men are generally breadwinners. No attempt has been made to correct for this deficiency in the study sample, but its probably relatively small effect on the cause information is discussed. If judged only by their prevalence in the general population, Negroes

[6] See chapters III and IV for a discussion of the size and regional distribution and of the characteristics of the blind population studied.

and Indians are heavily overrepresented in the study. Other studies have shown, however, that blindness is much more prevalent among Negroes and Indians than among white persons. The relative number of Negroes and Indians found in the study sample, therefore, may not be too large.

In general, from the characteristics of the recipients of aid to the blind included in the study, it seems reasonable to assume that the statistics presented here can supply at least valuable clues to relationships pertaining to causes of blindness among the present general blind population. However, any conclusions concerning the representativeness of the data—beyond the group to which they specifically relate—should be drawn with caution.

In the conduct of the study, care was exercised to assure as reliable information as possible. The medical records of the participating State agencies were found to be of a quality adequate to warrant study. As far as feasible, checks were introduced to assure uniform interpretation and application of the Standard Classification by the persons engaged in the several States in classifying the diagnostic information. It is clear, however, that in a repetition of the study the adequacy of the data could be improved.

The development of adequate statistics of any type requires continued efforts to strengthen basic recording, to define terms more precisely, to obtain uniform interpretations, and to improve classifications. No statistics pose more difficult problems in these respects than those derived from medical diagnoses. Despite limitations, the statistics of this report are believed to represent a significant advance toward the goal of comprehensive, comparative statistics of the causes of blindness, and to justify further efforts to obtain such statistics from State agencies administering programs of aid to the blind.

Chapter II.

PROCEDURE OF THE STUDY

States administering programs of aid to the needy blind with the help of Federal funds were invited in the latter part of 1940 to participate in the study. The invitation took the form of a letter to the State administrators of aid to the blind explaining the purposes and requirements of the study. A similar letter enlisted the interest of the State supervising ophthalmologists.

The study called for a relatively small amount of information concerning individual recipients of aid to the blind, on a date to be selected by each participating State. The medical diagnosis of the cause of blindness in terms of the site and type of the eye affection—the eye condition—and also of its etiology was required, together with such related facts as the age at which blindness occurred, the degree of blindness or extent of remaining vision, and whether or not the examining physician had recommended treatment to improve or conserve vision. Data were also requested concerning the age, sex, race, and residence of each blind recipient.

Each participating State was asked to compile this information in accordance with a uniform plan and to submit a copy of the resulting tabulations. From these tabulations this report has been prepared.

States Participating

States were accepted for participation through the year 1941. Of the 43 States[1] with aid to the blind programs under the Social Security Act at the end of that year, 20 met the few but essential requirements established for the study and provided the staff time necessary to assemble the data. These States had approximately 40 percent of all the recipients benefiting from aid to the blind under State-Federal programs at the end of 1941, and a little more than a fourth of the persons aided under all State programs for aid to the blind, including those operated outside the Social Security Act. The 20 participating States are as follows:

Arkansas	Louisiana	North Dakota	Tennessee
Connecticut	Maryland	Oklahoma	Virginia
Indiana	Massachusetts	Rhode Island	Washington
Iowa	New Hampshire	South Carolina	West Virginia
Kansas	New Jersey	South Dakota	Wisconsin

Requirements for Participation

Participation in the study was limited to State agencies which administered or supervised the administration of aid to the needy blind under

[1] This number does not include Hawaii, which had an approved program but was not included in the study because of the difficulty of providing consultation service in the preparation, coding, and review of records of eye examination.

a State plan approved by the Social Security Board. Under the standards established by the Bureau of Public Assistance to carry out the purposes of title X of the Social Security Act, approved State plans were required to provide, among other things, for (1) a definition of blindness; (2) the certification of blindness by physicians designated or approved by the State agency; (3) the filing of a report of the eye examination of each applicant, to be signed by the examining physician; and (4) the employment of a State supervising ophthalmologist to pass upon the decisions of the examining physicians concerning the blindness of applicants, and the adequacy of their reports. A major condition for participation in the study was that the State agency must maintain sufficiently complete and adequate records of eye examinations to yield the medical information needed for the study and to assure a substantial measure of comparability of the State data.

A considerable number of the States with programs under the Social Security Act were omitted because their eye-examination records were not sufficiently complete or detailed for the purpose of the study. In some instances the records as a whole were inadequate because of the wide differences in training and experience of the examining physicians. Several States whose eye-examination records were of good quality did not participate in the study because they had recently made tabulations of their data on causes of blindness.

Procedure for Collecting Data

To assure comparability in compiling the data, uniform instructions, forms, and table outlines were supplied to the State agencies.[2] The instructions were issued in two pamphlets.[3] One outlined the general plan of the study and dealt in detail with the cases to be included, the sources of data, and procedures for reviewing both the medical and the social data before recording them and for obtaining supplementary information when essential data were found to be inconsistent or lacking. Also included were detailed definitions and instructions regarding each of the items to be recorded.

The second pamphlet was concerned solely with information relating to the causes of blindness. With minor exceptions, this followed the manual on classification of causes of blindness of the Committee on Statistics of the Blind.[4] It contained the Standard Classification recommended by the Committee, together with an explanation of the classification and instructions for its use. It presented also an index of terms likely to occur in diagnoses of blindness, coded to correspond with the Standard Classification of causes.

[2] The statistical tabulating card for data concerning each recipient is reproduced in appendix C, p. 131.

[3] *Study of Causes of Blindness Among Recipients of Aid to the Blind:* Parts I and II, *General and Detailed Instructions;* Part III *Standard Classification of Causes of Blindness.* Federal Security Agency, Social Security Board, Washington, D. C., 1940.

[4] Kerby, C. Edith, *Manual on the Use of the Standard Classification of Causes of Blindness,* Committee on Statistics of the Blind, 1940.

Source of Information

All the facts required for the study came from records already in use for administrative purposes. The chief source of the information was the physician's report of the eye examination, but other documents were used to verify or supplement the medical eye record.

As already said all approved State plans for aid to the blind require the examining physicians to submit a report of the eye examination of each applicant for assistance whose blindness they are asked to certify. This report must be reviewed and approved by the State supervising ophthalmologist before action on the request for assistance is taken. Early in the operation of the State-Federal program, the Bureau of Public Assistance recommended a standard list of items to be recorded in the physicians' reports of the eye examination.

Under the approved procedure, if the examining physician's report is found by the supervising ophthalmologist to be incomplete or otherwise inadequate in any important respect, it should be returned promptly for completion or correction. Examination of the State records disclosed a good deal of variation in the extent to which reports actually were returned to the examining physicians for completion or correction of items other than those relating to the fact of blindness.

The completed physician's report is expected to contain, in addition to identifying social data, (1) a record of the extent of the recipient's remaining vision; (2) his age at onset of blindness, if it can be ascertained by the physician; (3) the complete diagnosis of the eye condition, including specification of both the nature of the eye defect producing blindness and its etiology, if determinable; (4) the prognosis; and (5) the physician's recommendation, if any, of medical or surgical treatment to improve or preserve vision.

Not infrequently, other medical information is on file relating to the eye condition of recipients—records, for example, of previous examinations to determine eligibility or records of or correspondence concerning treatment to improve vision or arrest progress of the eye affection. Reports of social investigations may also be on hand which contain information supplementing the medical record, especially with respect to the recipient's age at onset of blindness and the occurrence of blindness among relatives.

The instructions for the study indicated that preferably data were to be taken from the latest available record for each recipient but that, especially with respect to the diagnosis, all available records should be examined to ensure, insofar as possible, the completeness and accuracy of the information tabulated.

Responsibility of State Supervising Ophthalmologists

The instructions emphasized the importance of medical control of the preparation of all data relating to the causes of blindness, and

specified that preferably both the editing and the coding of this portion of the information should be done by the State ophthalmologist. If this was not possible, it was recommended that these tasks should be done under his direction, either by another physician or by a research worker qualified by experience to classify the recorded diagnoses.

In some of the States the supervising ophthalmologist reviewed and coded the diagnoses and other medical data. In other States that was done primarily by a nonmedical worker selected by the supervising ophthalmologist and working under his close supervision. In these instances, doubtful cases were referred for decision to the State ophthalmologist, who accepted final responsibility for the accuracy of the State's medical data.

Review of Data by Medical Consultant of the Social Security Board

During the development of State programs for aid to the blind under the Social Security Act, the medical consultant of the Bureau of Public Assistance visited some of the State public assistance agencies and consulted with their State supervising ophthalmologists concerning medical aspects of the program. He was therefore already familiar with the quality of the records of eye examination in some States. When this study was initiated, visits were made to other States to determine the suitability of their eye records for study purposes. These visits afforded an opportunity to discuss problems of classification of the diagnostic information. Questions regarding the application of the Standard Classification were also handled through correspondence between the State supervising ophthalmologists and the Bureau's medical consultant.

In addition, the supervising ophthalmologists of several States had a chance to discuss the classification procedure and related problems with the Bureau's medical consultant at a meeting arranged for this purpose in Chicago when the American Academy of Ophthalmology and Otolaryngology convened there in October 1941.

The need for a systematic test of the uniformity with which the considerable number of agencies taking part in the study applied the Standard Classification resulted in a request by the Bureau of Public Assistance for samples of the coded medical eye records for review. Most of the States were asked to supply roughly a 10-percent sample of their eye-examination records. In selecting the sample, they were instructed to omit cataract cases for which the etiology was reported as "unknown to science" and to substitute other records in their place. The exclusion of such cataract cases from the review was based on the assumption that if included they would constitute a lage part of each sample, and that this was not a diagnosis about which question concerning coding should be raised. Five States were not asked to submit records for this review, because the medical consultant was

already assured that their medical data had been consistently coded in accordance with the standard plan.

This review of the sample of medical records revealed relatively few instances of incorrect or doubtful coding. In the doubtful cases, the medical consultant prepared and submitted detailed comments, specifying in each instance the basis for questioning the classification assigned. If the questioned record related to a cause of blindness occurring frequently, it was recommended that the State supervising ophthalmologist consider the advisability of reviewing all similarly classified cases. It was made clear that the State ophthalmologist was at liberty to accept or reject any or all of the suggestions for reexamination of the coding. Most of the questioned classifications were carefully reconsidered. In each case the State ophthalmologist determined the final classification.

A general check of the information followed the receipt of the State tabulations. This occurred in the process of reviewing for consistency all the tabulated data. Following this examination, some further questions concerning the cause data were referred to the States by the medical consultant, and some further minor revisions of the data resulted.

Dates to Which State Studies Relate

Each State agency was invited to choose a convenient date for its analysis. The dates selected span a period of 13 months, from November 30, 1940, to December 31, 1941. In chronological order they are as follows:

State	*Date to which study relates*
Kansas	November 30, 1940
New Hampshire	November 30, 1940
Virginia	November 30, 1940
West Virginia	November 30, 1940
Connecticut	December 31, 1940
Indiana	December 31, 1940
Rhode Island	December 31, 1940
Wisconsin	December 31, 1940
Iowa	January 1, 1941
Louisiana	January 1, 1941
South Dakota	February 28, 1941
Oklahoma	March 31, 1941
Washington	April 1, 1941
Massachusetts	April 30, 1941
New Jersey	April 30, 1941
North Dakota	April 30, 1941
Tennessee	June 30, 1941
Maryland	August 31, 1941
Arkansas	October 31, 1941
South Carolina	December 31, 1941

Chapter III.

SIZE AND REGIONAL DISTRIBUTION OF THE BLIND POPULATION STUDIED

In point of size alone, the population of 20,591 blind persons to which this study relates would be adequate to supply representative information concerning the prevalence of blindness from different causes in the United States as a whole. The volume of information is larger than that of any previous study of causes of blindness in this country in which the cause data have been taken from medical records. However, as the foregoing account of procedure shows, the population studied is one for which data suitable for study were available, rather than one selected to represent either all blind persons in the United States or all recipients of aid to the blind. Before proceeding to examine the cause data themselves, it is desirable to consider in some detail the composition of this group of recipients and their personal characteristics, which may have important influence on the cause tabulations. That is done in this and the following chapter.

Numbers of Recipients in Participating States

In each participating State, the entire current roll of aid to the blind recipients was studied. The number of recipients varied materially from State to State, as would be expected, in part because of large differences in the total populations of the States.

Indiana supplied information concerning the largest number of blind persons, almost 12 percent of the total number. At the other extreme Rhode Island contributed less than one-half of 1 percent of the total

Table 1.—*Number of recipients of aid to the blind included in the study of each participating State, 20 States, in order of number of recipients*

State	Number of recipients	Percentage distribution
Total, 20 States	20,591	100.0
Indiana	2,413	11.7
Oklahoma	2,141	10.4
Wisconsin	2,014	9.8
Tennessee	1,526	7.4
Iowa	1,478	7.2
Kansas	1,388	6.8
Massachusetts	1,176	5.7
Louisiana	1,165	5.7
Arkansas	1,103	5.4
Washington	1,053	5.1
Virginia	1,030	5.0
West Virginia	833	4.0
South Carolina	800	3.9
New Jersey	757	3.7
Maryland	666	3.2
New Hampshire	297	1.4
South Dakota	265	1.3
North Dakota	231	1.1
Connecticut	189	.9
Rhode Island	66	.3

group. As is evident from table 1, six States—Indiana, Oklahoma, Wisconsin, Tennessee, Iowa, and Kansas—supplied more than half the recipients included in the study. In contrast, the five States with the smallest numbers of recipients—New Hampshire, North and South Dakota, Connecticut, and Rhode Island—together supplied only 5 percent.

The differences in the number of recipients included in the component studies are important for two reasons. One is that each State exerts influence in the aggregate tabulations in proportion to the size of its study group. This fact needs to be recalled especially in considering the differences in the characteristics of the recipient groups, some of which affect significantly the proportions of blindness resulting from particular causes. The second reason is that for some of the States the numbers concerned are much too small to yield stable results. Even a small increase in the number of recipients, or small errors in the data, could have relatively large effect on the figures of at least the five States at the end of the list in table 1. On this account, in the tables presenting comparative cause statistics for the States, the figures for Rhode Island and Connecticut especially need to be accepted with severe reservations.[1]

For these two reasons, the order of table 1 has been followed in several of the subsequent tables in which State figures are compared, including the two appendix tables presenting comparative data for the 20 States (tables A-3 and A-9).

Regional Distribution of the Study Population

Notwithstanding the significant differences in the State contributions, no single State or particular region has a predominating influence in the study. Eight of the nine geographic divisions of the Bureau of the Census are represented by at least one participating State. Only the Mountain region, which in 1940 had only 3.2 percent of the population of the United States, is not represented. The regional distribution of the study population in comparison with that of the total population and also of the estimated total number of blind persons in the United States, is shown in table 2.

Eight of the cooperating States, with 45 percent of the recipients, are located in the South. As gauged by the general population, this constitutes heavy overweighting of the South as a whole, for the three Southern geographic divisions together accounted for not quite 32 percent of the total population in 1940. Blindness is probably much more prevalent in the South, however, than in other regions, so that

[1] If consideration were given only to the statistical stability of the data for the States having small recipient groups, especially Rhode Island and Connecticut, it would have been preferable to omit them from all tables of the study containing State comparisons. For several reasons, however, it seemed desirable to present the available comparative figures for each of the participating States. It is of some interest, for example, that even the very small recipient groups of Rhode Island and Connecticut reveal a substantial amount of conformity to the general patterns found in tables A-3 and A-9. Differences from the general patterns in the data of these States should not, however, be regarded as necessarily significant.

a larger representation of this area in the study population than in the general population was desirable. Together the three Southern divisions have 40 percent of the estimated total blind population of the country.[2]

Although four of the six New England States took part in the study, three of them have small recipient groups. This section, however, is somewhat overrepresented. The neighboring Middle Atlantic region is much underrepresented, New Jersey, with a small recipient group, being the only one of the three large States comprising this geographic division to participate.

The West North Central region appears to have somewhat too much representation in the study, but this may partially offset the lack of any representation of the Mountain States.

Of the three Pacific Coast States, Washington alone participated. Its relatively large recipient group gives close to the desired representation for the Pacific region.

[2] See page 14.

Table 2.—*Distribution of recipients of aid to the blind included in the study, of the total population of the United States, and of the estimated total blind population, by geographic division*

Geographic division and participating State	Percentage distribution		
	Recipients of aid to the blind, 20 States	Total population of United States (1940)	Estimated total blind population of United States (1940)
Total, United States	.....	100.0	100.0
Total, 20 States	100.0	32.8	33.7
New England	8.3	6.4	5.8
New Hampshire	1.4	.....	.....
Massachusetts	5.7	.....	.....
Rhode Island	.3	.....	.....
Connecticut	.9	.....	.....
Middle Atlantic	3.7	20.9	17.6
New Jersey	3.7	.....	.....
East North Central	21.5	20.2	17.8
Indiana	11.7	.....	.....
Wisconsin	9.8	.....	.....
West North Central	16.4	10.3	9.6
Iowa	7.2	.....	.....
North Dakota	1.1	.....	.....
South Dakota	1.3	.....	.....
Kansas	6.8	.....	.....
South Atlantic	16.1	13.5	17.9
Maryland	3.2	.....	.....
Virginia	5.0	.....	.....
West Virginia	4.0	.....	.....
South Carolina	3.9	.....	.....
East South Central	7.4	8.2	10.8
Tennessee	7.4	.....	.....
West South Central	21.5	9.9	11.4
Arkansas	5.4	.....	.....
Louisiana	5.7	.....	.....
Oklahoma	10.4	.....	.....
Mountain	.....	3.2	2.6
Pacific	5.1	7.4	6.5
Washington	5.1	.....	.....

Numbers of Recipients in Relation to Numbers of Blind Persons

It is unfortunate that no authoritative statistics are available to indicate the total number of blind persons in the United States as a whole and in the individual States and regions. A series of attempts, extending over more than a century, was made to obtain separate statistics for this handicapped group at the time of the general population census. With the census of 1940 these attempts were discontinued, because of serious deficiencies in the results of all the preceding enumerations. In several States, surveys of the prevalence of blindness have been conducted at different times and with different methods, but few have approached completeness. Some States now maintain registers of known blind persons, which vary widely in completeness. The purpose of the registers has not been primarily statistical, and they give undependable indication of the total amount of blindness.

It is recognized that there are significant differences in the gross rates of blindness in different parts of the country. Some of the factors that account for regional variations are: the composition of the population, especially with respect to age and race; the extent and effectiveness of public health measures; and, much less important, the frequency of certain kinds of occupations. It is safe to assume, also, that differences in levels of economic well-being have influenced the amounts of blindness in different parts of the country to an important extent.

The lack of adequate statistics of the amount and distribution of blindness obtained through either general censuses or special surveys led one of the authors of this report to prepare the estimated figures of which use is made in both tables 2 and 3. The estimates are based on population data for 1940. The figure for the United States as a whole is the sum of separate estimates for each of the States. The State figures were obtained by a uniform procedure, in which consideration was given only to these principal factors: the proportions in the general population of persons over 65 years of age, of Negroes, and of Indians; and general health conditions. The estimates relate to "economic blindness," as have the data of the successive Federal decennial censuses of blind persons and most State and local surveys of the prevalence of blindness. In this respect they correspond also to the recipient figures.[3]

The estimated figures are by no means a satisfactory substitute for actual prevalence statistics, but perhaps they can be accepted as affording a useful indication of probable differences in gross prevalence of blindness. Specifically, they should be interpreted as registering variations among the States that might be expected as a result of differences

[3] The estimates are explained in testimony of Ralph G. Hurlin before the House of Representatives Committee on Labor, Subcommittee to Investigate Aid to the Physically Handicapped (78th Cong., 2d sess., *Hearings Pursuant to H. Res. 230*, part 4, pp. 587–591). See also "Estimates of Blindness in the United States," *Social Security Bulletin*, Vol. 8, No. 3 (March 1945), p. 18.

in the composition of general populations and in standards of public health.

It is of interest to note from table 2 that the 20 States participating in the study account for a third of the estimated total blind population of the country and almost the same proportion of the total general population in 1940. Each of the three Southern regions has a larger proportion of the estimated total blind population than of the general population. The relationship is reversed for each of the other geographical areas.

The estimated numbers of blind persons and rates of blindness are given for each of the 20 participating States in table 3. This table also contains the proportions which the recipient groups of these States bear to their estimated total blind populations.

For the 20 States together, the estimates indicate that a little more than a fourth (26.5 percent) of all persons with loss of vision sufficient

Table 3.—*Estimated number of blind persons compared with number of recipients of aid to the blind, 20 States, by geographic division*

Geographic division and participating State	Estimated total blind population (1940)		Recipients of aid to the blind	
	Number	Rate per 1,000 population	Number	Percent of estimated number of blind persons
Total, United States	230,354	1.7	[1] 77,216	33.5
Total, 43 States with State-Federal program of aid to the blind [1]	190,967	1.8	[1] 52,539	27.5
Total, 20 States	77,605	1.8	20,591	26.5
New England:				
New Hampshire	861	1.8	297	34.5
Massachusetts	6,821	1.6	1,176	17.2
Rhode Island	1,027	1.4	66	6.4
Connecticut	2,478	1.4	189	7.6
Middle Atlantic:				
New Jersey	6,115	1.5	757	12.4
East North Central:				
Indiana	5,793	1.7	2,413	41.7
Wisconsin	4,519	1.4	2,014	44.6
West North Central:				
Iowa	4,086	1.6	1,478	36.2
North Dakota	835	1.3	231	27.7
South Dakota	971	1.5	265	27.3
Kansas	3,098	1.7	1,388	44.8
South Atlantic:				
Maryland	3,733	2.0	666	17.8
Virginia	6,159	2.3	1,030	16.7
West Virginia	2,606	1.4	833	32.0
South Carolina	5,510	2.9	800	14.5
East South Central:				
Tennessee	5,745	2.0	1,526	26.6
West South Central:				
Arkansas	4,268	2.2	1,103	25.8
Louisiana	6,359	2.7	1,165	18.3
Oklahoma	3,948	1.7	2,141	54.2
Pacific:				
Washington	2,673	1.5	1,053	39.4

[1] As of December 1941; excludes Hawaii.

to bring them within the scope of the usual definition of blindness were on the assistance rolls at the time of the study. This proportion is somewhat less than that for all States having a State-Federal program of aid to the blind (27.5 percent), and less still than that for all States (33.5 percent). Pennsylvania's pension program is chiefly responsible for the higher percentage for the entire country.

These proportions for individual participating States vary from only 6 and 8 percent for Rhode Island and Connecticut to 54 percent, or well over half of its estimated blind population, for Oklahoma. Differences among the States in the proportions of blind persons who are in need could account for some of the wide variation in these percentages. To a much greater extent, probably, they are to be explained by other factors described below.

Other Factors Affecting Numbers of Recipients

Numerous legal, administrative, and fiscal factors may be responsible for disparities in the relative numbers of recipients of aid to the blind in the several States. Some of these factors are of major significance.

As expressed in the Social Security Act, the purpose of Federal grants to the States for aid to the blind is to enable "each State to furnish financial assistance, as far as practicable under the conditions in such State, to needy individuals who are blind." The act specifies certain conditions to which a State program must conform if the State is to receive Federal financial help, but otherwise leaves to the State full responsibility for determining the scope and character of the program. Thus State programs differ materially with respect to the specific terms of eligibility for aid and the standards for determining who is needy and how much assistance a needy person may get. There is also wide difference among the States concerning the choice of program under which older needy blind persons are given assistance.

Under title X of the Social Security Act, a State receiving Federal matching funds may aid any needy blind person unless he is living in a public institution. The act, however, does not define either need or blindness. As stated in chapter I, the 20 States participating in the study have adopted definitions of blindness identical with or closely similar to the definition recommended by the Bureau of Public Assistance. With respect to the determination of need, on the other hand, the States vary widely in their provisions. Obviously, the more liberal the State standards for consideration of the requirements and resources of needy individuals, the larger the number of recipients. Generally the standards of assistance tend to be higher in States with relatively large economic resources and lower in those with relatively small economic resources. The States in the study vary greatly in their financial ability to support assistance programs.

Although the Social Security Act authorizes a State to grant assistance with Federal matching funds to any needy blind person except

one residing in a public institution, it also permits a State to establish conditions of eligibility that exclude certain blind persons who are needy. A State may impose a condition of residence or citizenship, though the Social Security Act places certain limitations on these restrictions. For example, no State may impose a requirement of residence that excludes any person who has resided in the State for 5 of the last 9 years and 1 year continuously immediately preceding application. Similarly, no State may impose a citizenship requirement that excludes any citizen of the United States. Of the 20 States participating in the study, all required some State residence at the time of the study, but the requirements varied from as little as 6 months to the full 5 years. Eleven of the 20 States waived residence requirements for certain applicants. Only 4 of the 20 States excluded either all noncitizens or those who, at the time of application for assistance, had not applied for citizenship.

Although persons of all ages can be assisted under the provisions of the Social Security Act, all but 7 of the 20 participating States imposed age limitations. The minimum ages established by the other 13 States vary from 5 to 21 years, sometimes with exceptions for persons who became blind in the State or who could not attend a State school for the blind. Only one of the 20 States specified a maximum age.

Even in States with no minimum age requirement, few persons under 20 years of age received aid to the blind. The two facts that the total number of blind children is relatively small, and that many of those who are both blind and needy are attending schools for the blind, largely account for the small number of young recipients. Some blind children also may be receiving aid to dependent children, but since this type of aid is limited to children deprived of parental support or care because of death, continued absence, or incapacity of a parent, the number is likely to be very small.

For blind persons 65 years of age and over, the States have the alternative of providing assistance through either the old-age assistance or the aid to the blind program, but the same individual cannot receive both types of aid. Since in all States a large proportion of all blind persons are aged 65 or more, differences in practice in providing one or the other type of aid to aged blind persons materially affect the number of persons on the aid to the blind rolls. Similarly, State differences in the extent to which blind persons receive care in public institutions or through general assistance may affect the number of recipients of aid to the blind.

There is obvious preference in many States for granting old-age assistance instead of aid to the blind to aged blind persons. In some States, at the time of the study, appropriations for old-age assistance were more liberal than those for aid to the blind; in some, also, the maximum monthly payment that could be made to a needy person was higher in old-age assistance. To some extent, the old-age assistance

program may be preferred because the necessity of an eye examination is thus avoided. For infirm persons and persons in rural areas, the ophthalmological examination may often be difficult to obtain.

For whatever reasons, it appears probable that, at the time of the study, in most of the participating States needy aged blind persons were receiving old-age assistance to an extent that significantly affected the age distribution of the recipients of aid to the blind. The variations in State recipient groups with respect to age and certain other factors and the effects of these variations on the data are considered in the following chapter and in later discussion of causes.

Urban or Rural Residence

The factor of size of place of residence deserves consideration in connection with that of geographical area, since it may greatly influence the variation in gross prevalence of blindness in different parts of the country. The South generally, for example, has a smaller urban population and a much smaller population in the very large cities than the other major geographic divisions.

No attempt has been made to estimate the distribution of the total blind population of the country by size of place or as between urban and rural areas. To do so would be impracticable because so few dependable data are available concerning the relation of this factor to the extent of blindness.[4] The most significant of the extremely limited evidence on this point is provided by the National Health Survey. Although that investigation was concerned almost exclusively with urban areas, all or parts of some rural counties in three States were studied and higher rates of blindness were found in them than in urban areas generally. Among the cities surveyed, except in the West, some tendency was found for the rates of blindness of white persons to be higher in smaller cities than in larger ones. [5]

In table 4 the distribution by size of place of residence of the recipients is compared with that of the general population. For the 20 States together, the distributions are practically identical. The participating States are, however, only roughly representative of the entire country in this respect. For the Nation as a whole, somewhat smaller proportions of the population reside in smaller cities and in rural areas.

In several States, also, including the 3 that have more than 2,000 recipients, the correspondence between the percentages in the table is surprisingly close. For some States, on the other hand, the correspondence is not close, and for several the comparison suggests that at the date to which the figures relate the aid to the blind program may have been reaching blind persons to a much greater extent in the large cities than in smaller cities or rural areas. Thus, although only 14 of the 20

[4] Sanders, Barkev S., "The Blind — Their Number and Characteristics," *Social Security Bulletin*, Vol. 6, No. 10 (October 1943), p. 18.

[5] Britten, Rollo H., "Blindness, as Recorded in the National Health Survey — Amount, Causes, and Relation to Certain Social Factors," *Public Health Reports*, Vol. 56, No. 46 (Nov. 14, 1941), p. 2193, footnote, and pp. 2207–2208.

States have cities of over 100,000 population, for 9 of them the table shows that a substantially greater proportion of recipients than of the general population are in large cities. Only 4 have a proportion of rural recipients as large as that of the rural general population. In the absence of information concerning the relative numbers of needy blind persons in the urban and rural areas of these States, question can merely be raised as to whether the program is serving the rural communities as fully as it does the more populous areas.

Table 4.—*Urban or rural residence of recipients of aid to the blind and of the total population, 20 States, in order of number of recipients*

State	Number of recipients	Percentage distribution of recipients				Percentage distribution of total population (1940)			
		Total	Urban residence		Rural residence	Total	Urban residence		Rural residence
			Places of 100,000 or more	Places of 2,500 to 99,999			Places of 100,000 or more	Places of 2,500 to 99,999	
Total, United States	.....	.....	.....	.....	.....	100.0	28.8	27.7	43.5
Total, 20 States[1]	20,591	100.0	20.2	31.8	48.0	100.0	20.0	31.7	48.3
Indiana	2,413	100.0	19.3	33.7	47.0	100.0	21.0	34.1	44.9
Oklahoma[1]	2,141	100.0	12.1	25.9	61.5	100.0	14.8	22.8	62.4
Wisconsin	2,014	100.0	17.3	36.7	46.0	100.0	18.7	34.8	46.5
Tennessee	1,526	100.0	30.8	11.9	57.3	100.0	24.0	11.2	64.8
Iowa	1,478	100.0	13.5	44.3	42.2	100.0	6.3	36.4	57.3
Kansas	1,388	100.0	15.6	37.1	47.3	100.0	13.1	28.8	58.1
Massachusetts	1,176	100.0	51.6	44.7	3.7	100.0	38.3	51.1	10.6
Louisiana	1,165	100.0	27.0	29.7	43.3	100.0	20.9	20.6	58.5
Arkansas	1,103	100.0	.....	27.0	73.0	100.0	.....	22.2	77.8
Washington	1,053	100.0	33.2	34.2	32.6	100.0	34.5	18.6	46.9
Virginia	1,030	100.0	11.2	20.5	68.3	100.0	12.6	22.7	64.7
West Virginia	833	100.0	.....	26.9	73.1	100.0	.....	28.1	71.9
South Carolina	800	100.0	.....	37.5	62.5	100.0	.....	24.5	75.5
New Jersey	757	100.0	39.9	42.3	17.8	100.0	29.4	52.2	18.4
Maryland	666	100.0	57.2	14.1	28.7	100.0	47.2	12.1	40.7
New Hampshire	297	100.0	.....	63.6	36.4	100.0	.....	57.6	42.4
South Dakota	265	100.0	.....	15.5	84.5	100.0	.....	24.6	75.4
North Dakota	231	100.0	.....	22.1	77.9	100.0	.....	20.6	79.4
Connecticut	189	100.0	48.7	48.7	2.6	100.0	27.8	40.0	32.2
Rhode Island	66	100.0	53.0	47.0	.....	100.0	35.5	56.1	8.4

[1] Size of place of residence not reported for 12 recipients.

Chapter IV.

CHARACTERISTICS OF RECIPIENTS

The data assembled make it possible to test the homogeneity of the State recipient groups with respect to five personal characteristics that are of importance in connection with the analysis of the information on causes of blindness. The resulting comparisons are of interest also because of the differences they reflect in the use of the State programs of aid to the blind.

Sex

In each of the 20 States, more men than women were included in the recipient groups. For the 20 States combined the proportion of males was 62.2 percent, or well over three-fifths, while the State proportions vary from only 52.4 percent in Connecticut to as high as 73.1 percent in West Virginia. In 6 States, two-thirds or more of the recipients were males.

For the three racial groups of recipients the division by sex was almost identical, the percentages being 62.3 for white persons; 61.7 for Negroes; and 62.3 for Indians.

The States are arranged in table 5 in order of the proportion of male recipients. The States having larger total numbers of recipients are

Table 5.—*Sex of recipients of aid to the blind, 20 States, in order of the proportion of males*

State	Number of recipients			Percent male	
	Total	Male	Female	Recipients	Total population (1940)
Total, 20 States	20,591	12,806	7,785	62.2	50.1
West Virginia	833	609	224	73.1	50.9
Arkansas	1,103	757	346	68.6	50.4
Louisiana	1,165	787	378	67.6	49.6
North Dakota	231	156	75	67.5	52.2
Tennessee	1,526	1,026	500	67.2	49.6
Washington	1,053	701	352	66.6	52.2
Kansas	1,388	896	492	64.6	50.3
Oklahoma	2,141	1,376	765	64.3	50.6
South Dakota	265	166	99	62.6	51.7
Maryland	666	413	253	62.0	50.2
New Jersey	757	469	288	62.0	49.7
Virginia	1,030	630	400	61.2	50.4
South Carolina	800	477	323	59.6	49.2
Massachusetts	1,176	678	498	57.7	48.7
Wisconsin	2,014	1,157	857	57.4	51.0
New Hampshire	297	169	128	56.9	49.8
Indiana	2,413	1,373	1,040	56.9	50.3
Iowa	1,478	830	648	56.2	50.4
Rhode Island	66	37	29	56.1	49.0
Connecticut	189	99	90	52.4	49.7

found well scattered in this list, with the result that the median State percentage (62.0) is almost the same as that for the total group.

Table 5 also contains for each state the percentage of males in the total population. From these figures it will be seen that in none of the 20 States do males greatly outnumber females in the general population, while in 8 of them females are more numerous. But in all the States except Connecticut whose recipients are very few, the proportion of males in the total population is much smaller than among the recipients of aid to the blind.

Most studies of the prevalence of this handicap have pointed to the conclusion that relatively more men than women are blind. All the incomplete enumerations of the blind in connection with the decennial population censuses from 1850 to 1930 gave this result.[1] In 1930, when the last such enumeration was made, males were 57.5 percent of all recorded blind persons, but only 50.6 percent of the general population. In the urban areas covered by the National Health Survey, 50.5 percent of the 2,068 persons blind in both eyes were males, although males comprised only 48.1 percent of the population surveyed.

Two principal reasons have been advanced to explain the higher proportion of blindness among men. One is the greater exposure of men to the risk of both industrial and nonindustrial accidents; the other, their presumed higher rate of syphilis infection. That the rate of syphilis infection is much higher for men than for women has been generally accepted in the past. In his book, *Shadow on the Land*, Dr. Thomas Parran states that syphilis is more prevalent among men and cites as a probable ratio 50 percent more men than women infected.[2] Recent data obtained from mass blood tests conducted under the auspices of public health authorities in several cities suggest, however, that at present the prevalence of syphilis in the general population may be not very different for the two sexes. Both accidents and syphilis have been and continue to be among the leading causes of blindness in the United States. In fact syphilis may be the single most important specific cause of blindness of persons who are now blind in this country.[3]

It should be emphasized that the proportion of males is likely to be much higher among aid to the blind recipients than among all blind persons. The excess of males in the assistance groups may be attributed partly to the probability that more men than women who suffer loss of sight were previously the principal source of their own support. It is probably true, moreover, that blind men are able less often than blind women to make adjustments with relatives or friends that obviate the necessity of public assistance.

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[1] In the two earlier censuses, in 1830 and 1840, the sex of the enumerated blind persons was not recorded.

[2] Parran, Thomas E., M. D., *Shadow on the Land: Syphilis*, American Social Hygiene Association Edition, 1938, p. 63.

[3] See page 75.

Race

Of the recipients studied, 16,026, or nearly four-fifths, were white; 4,177, or one-fifth, were Negroes; and 326, or 1.6 percent, were Indians. Only 6 recipients were of other races, while the race of 56 was not reported.

Both Negroes and Indians appear to be substantially overrepresented in the study when judged by their proportions in the total population. In 1940, Negroes comprised 9.8 percent of the population of the United States and 10.3 percent of the combined general population of the 20 participating States, while Indians constituted about one-fourth of 1 percent of both population groups. Whether the two races are overrepresented in the study as compared with their proportions among all blind persons cannot be stated conclusively, because of lack of adequate information concerning the racial distribution of all blind persons. Substantially larger proportions of both Negroes and Indians, however are to be expected among the blind than in the general population, for reasons discussed below.

In all States in which there are considerable numbers of either Negroes or Indians, their proportions among the recipients are much larger than in the total population (table 6). In New Jersey, Negroes are more than four times, in Kansas more than three times, and in Maryland about three times, as numerous among the recipients as in the general population. In the 20 States combined, Negroes are about

Table 6.—*Race of recipients of aid to the blind and of the total population, 20 States, by region*

Region and State	Number of recipients	Percentage distribution of recipients					Percentage distribution of total population (1940)				
		Total	White	Negro	Indian	Other races	Total	White	Negro	Indian	Other races
Total, 20 States[1]	20,591	100.0	77.8	20.3	1.6	(2)	100.0	89.3	10.3	0.3	0.1
North:											
New Hampshire	297	100.0	99.3	.7	.....	.....	100.0	99.9	.1	(2)	(2)
Massachusetts	1,176	100.0	95.5	4.4	.....	0.1	100.0	98.6	1.3	(2)	.1
Rhode Island	66	100.0	93.9	6.1	.....	.....	100.0	98.4	1.5	(2)	.1
Connecticut	189	100.0	91.0	9.0	.....	.....	100.0	98.0	1.9	(2)	.1
New Jersey	757	100.0	76.1	23.9	.....	.....	100.0	94.5	5.5	(2)	(2)
Indiana	2,413	100.0	92.5	7.5	.....	.....	100.0	96.4	3.6	(2)	(2)
Wisconsin[1]	2,014	100.0	97.3	.6	1.9	.1	100.0	99.2	.4	.4	(2)
Iowa	1,478	100.0	96.3	3.3	.3	.1	100.0	99.3	.7	(2)	(2)
North Dakota	231	100.0	91.3	.9	7.8	.....	100.0	98.4	(2)	1.6	(2)
South Dakota	265	100.0	57.0	.....	43.0	.....	100.0	96.3	.1	3.6	(2)
Kansas	1,388	100.0	87.5	12.3	.2	.....	100.0	96.3	3.6	.1	(2)
Washington[1]	1,053	100.0	90.2	1.0	3.7	.....	100.0	97.8	.4	.7	1.1
South:											
Maryland	666	100.0	49.8	50.0	.2	.....	100.0	83.4	16.6	(2)	(2)
Virginia	1,030	100.0	50.5	49.5	.....	.....	100.0	75.3	24.7	(2)	(2)
West Virginia	833	100.0	87.3	12.7	.....	.....	100.0	93.8	6.2	(2)	(2)
South Carolina	800	100.0	30.9	69.0	.....	.1	100.0	57.1	42.8	.1	(2)
Tennessee	1,526	100.0	63.4	36.6	.....	.....	100.0	82.6	17.4	(2)	(2)
Arkansas	1,103	100.0	60.1	39.9	.....	.....	100.0	75.2	24.8	(2)	(2)
Louisiana	1,165	100.0	40.8	59.2	.....	.....	100.0	64.0	35.9	.1	(2)
Oklahoma	2,141	100.0	80.5	14.4	5.1	(2)	100.0	90.1	7.2	2.7	(2)

[1] The race of 2 recipients in Wisconsin and 54 recipients in Washington was not reported.
[2] Less than 0.05 percent.

twice, and Indians more than five times, as frequent among the recipients as in the general population.

As would be expected, most of the Negro blind included in the study were in Southern States. In Louisiana and South Carolina, Negroes comprised much more than half the total recipient group. In Maryland and Virginia they were half, and in Arkansas and Tennessee more than a third, of the recipients. Only three of the Northern States — Indiana, Kansas, and New Jersey — had as many as 100 Negro recipients, but in New Jersey Negroes were nearly a fourth of the total number. For these six Southern States and New Jersey, the proportions of Negro recipients were large enough to influence materially the cause-of-blindness tabulations.

So few Indians were included in the study that they have very little influence on the cause tabulations. Eight States reported some Indian recipients, but only two States had an appreciable number. A few more than 100 Indians comprised 43 percent of South Dakota's small recipient group, while approximately the same number represented only 5.1 percent of Oklahoma's much larger roll of recipients. Only South Dakota had a sufficiently large proportion of Indians to influence greatly the results of a State study.

Available evidence indicates that, in the United States generally, the rate of prevalence of blindness has been much higher for both Negroes and Indians than for the white population. The differences in the rates should probably be attributed mainly to differences in economic status and consequently in access to medical care. This conclusion is not inconsistent, it should be noted, with the probability that higher-than-average rates of syphilis infection and of accidents for Negroes and of trachoma for Indians are among the important reasons for their higher rates of blindness.

The National Health Survey found rates of prevalence of blindness for Negroes in urban areas from two to three times as high as those for white persons, with the largest differences in Southern cities. The generally inferior provisions made for the education of Negroes and the relatively low standards of public health protection in many States with large Negro populations are also likely to contribute significantly to the relatively larger numbers of Negro than of white blind persons.

Because of their generally poorer economic condition, it is reasonable to expect that a much larger proportion of Negroes than of white persons who are blind are in need of public assistance. On this account there is likely to be overrepresentation of the Negro blind in the recipient groups of the States having substantial numbers of Negroes in the general population. In some of these States, however, as a result of limitation of funds and lack of uniformity of procedure in accepting applicants for aid, it is possible that the number of Negroes among the recipients of aid to the blind materially understates the extent of need among blind Negroes.

Much of the greater prevalence of blindness among Indians than among white persons is clearly due to trachoma. This disease has long been endemic among Indians, as it has also in the white population of certain parts of this country. In a survey made by the United States Office of Indian Affairs in 1937, it was found that among more than 165,000 Indians studied, 5 per 1,000 were blind; in almost half the cases trachoma was assigned as the cause of blindness.[4]

In common with the Negro blind, a very large proportion of Indians who are blind are likely to be in need of assistance. The extent to which needy blind Indians in the various States appear on the aid to the blind rolls varies because of differences in practice with respect to granting assistance to Indians. Those who live on reservations are eligible for a variety of services, sometimes including financial assistance, from the Office of Indian Affairs. The resources of this agency for the relief of needy Indians are not large, however, and it is not the policy of the Office of Indian Affairs to grant aid to Indians on reservations if they are eligible for assistance under the Social Security Act. Federal matching funds are available for assistance to needy blind Indians under the program of aid to the blind, whether or not they are on reservations, but State policies differ sharply in this respect.

Age

Blindness is predominantly a handicap of older persons. This is so partly because most persons who become blind earlier in life live on to old age.[5] The principal reason, however, is that the incidence of blindness rises progressively with age, from extremely low rates in childhood to very high ones in the later years. Two of the most frequently occurring eye conditions that result in blindness, cataract and glaucoma, are principally diseases of old age.

The proportion of elders in the total blind population has been increasing gradually over a long period as a result of the progressive aging of the general population, the rate of which has increased materially in recent years. Another factor that has contributed to increase the proportion of older persons among the blind is the substantial progress that has been made in the control of important causes of blindness at earlier ages, including various infectious diseases and accidents involving the eye. Because the incidence of numerous important causes of blindness varies markedly with age, it follows that the age composition of the blind population concerned will have large significance in any statistical study of the causes of blindness.

The median age of the entire group of recipients included in this

[4] Forster, Wesley G., M. D., and McGibony, J. R., M. D., "Trachoma," *American Journal of Ophthalmology*, Vol. 27, No. 10, pt. 1 (October 1944), p. 1111.

[5] The mortality of blind persons has been found to be materially higher than that of the general population — not, as has sometimes been assumed, because of accidents attributable to blindness but because of diseases which cause blindness. There is, however, high fatality from relatively few causes of blindness. See "Mortality of the Blind," *Statistical Bulletin, Metropolitan Life Insurance Co.*, Vol. 16, No. 9 (September 1935), p. 1.

study was approximately 59 years. There was some, but not a substantial, difference in the median ages of male and female recipients and of Negro and white recipients. The median age of the 12,806 men was 58 years, and that of the 7,785 women was 60 years. For the Negro recipients the median age was 56 years and for the white recipients, 60 years.

The relatively advanced median age of the blind recipients contrasts sharply with that of the total population of the United States, which in 1940 was 29 years. Yet it is clear that the average age of the recipients is too low to be representative of blind persons generally. With respect to age, the 2,068 blind persons enumerated in the National Health Survey are more likely to be typical of the total blind population. Their median age was 64 years, but, because the average age of the blind population as well as that of the general population is increasing, even this median age may be lower than that of all blind persons today, or even at the time these State studies were made.

Table 7.—*Age of recipients of aid to the blind, 20 States, in order of the proportion 65 years and over*

[Italicized percentage represents the most frequently reported age for each State]

State	Number of recipients	Percentage distribution of recipients by age									Percent 65 years and over
		Total	Under 20	20–29	30–39	40–49	50–59	60–69	70–79	80 years and over	
Total, 20 States[1]	20,591	100.0	0.5	5.6	10.1	14.7	22.3	*26.5*	13.1	7.1	31.5
Washington	1,053	100.0	.....	3.9	5.5	8.1	16.8	*22.6*	21.7	21.4	55.5
New Hampshire[1]	207	100.0	.....	4.4	6.7	12.5	12.8	21.5	*22.0*	12.8	54.6
Kansas	1,388	100.0	1.2	3.0	5.1	7.3	17.0	*26.8*	26.3	13.3	53.0
Wisconsin	2,014	100.0	.2	5.4	7.3	11.6	17.8	*23.7*	19.4	14.6	44.8
North Dakota	231	100.0	.....	6.5	10.8	12.1	16.4	*25.1*	13.9	15.2	43.7
Indiana[1]	2,413	100.0	.1	4.6	9.0	10.7	18.8	*28.9*	20.8	7.1	42.7
Virginia[1]	1,030	100.0	.4	4.5	9.1	13.7	21.3	*24.3*	17.8	8.4	37.9
Iowa[1]	1,478	100.0	.6	7.8	8.1	13.3	18.4	*27.7*	14.1	9.8	35.7
Arkansas	1,103	100.0	.1	3.0	8.8	13.4	23.9	*34.9*	11.0	4.9	34.3
Massachusetts[1]	1,176	100.0	.....	5.2	11.4	17.4	*26.7*	22.9	9.5	6.6	22.7
West Virginia	833	100.0	.....	5.9	15.1	18.1	24.1	*25.8*	7.7	3.3	22.6
Tennessee	1,526	100.0	.3	8.5	13.6	15.6	23.8	*26.7*	8.7	2.8	21.2
Maryland	666	100.0	.1	4.8	11.7	18.9	*28.7*	27.3	6.8	1.7	20.9
South Carolina	800	100.0	1.4	8.6	18.2	19.4	20.9	*24.9*	5.7	.9	18.1
New Jersey	757	100.0	.....	5.2	9.5	21.7	27.0	*27.7*	6.3	2.6	18.0
Oklahoma	2,141	100.0	1.3	6.5	11.6	18.2	26.6	*28.7*	5.1	2.0	15.7
Louisiana	1,165	100.0	.8	5.2	13.0	20.3	*31.7*	26.7	2.0	.3	11.5
Rhode Island	66	100.0	.....	9.1	18.2	*31.8*	16.7	22.7	.....	1.5	9.1
South Dakota	265	100.0	.8	9.1	13.2	23.8	*32.4*	20.7	.....	.....	3.0
Connecticut	189	100.0	5.3	13.8	14.3	22.2	*26.4*	18.0	.....	.....	1.6

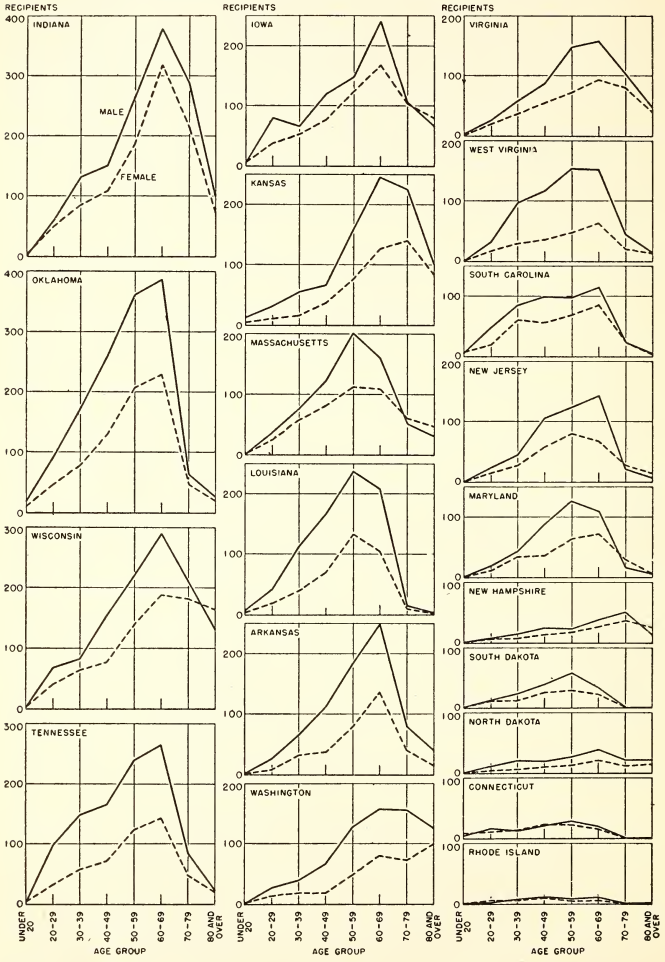
[1] The age of 14 recipients (5 in Virginia, 4 in Massachusetts, 3 in Iowa, 1 in Indiana, 1 in New Hampshire) was not reported.

In table 7 comparison is made of the age distribution of recipients at the time of the study in each of the 20 participating States. The table gives also for each State the percentage of the recipients 65 years of age or over. The States are arranged in order of this proportion. Sixty-five years was chosen for this purpose, because in all the States taking part in this study, and in all other States except Colorado, it is the

minimum age of eligibility for the State-Federal program of old-age assistance.

This table shows strikingly the effect of differences in the extent of use of the several available means of providing assistance to needy

Chart 2.—*Distribution of recipients of aid to the blind by sex and age, 20 States*



older blind persons. Slightly more than three-tenths of all the recipients studied were 65 years or over. At the bottom of the list, Connecticut and South Dakota had only scattering recipients who had reached 65 and none over 70 years, while Rhode Island had only one recipient who had passed 70 years. On the other hand, in the five States at the top of the list, from 13 to 21 percent of the recipients had reached 80 years of age, and in three of these States — Washington, New Hampshire, and Kansas — more than half were 65 years or over. Only in these three States do the proportions of older recipients appear as large as might be expected if the aid to the blind program alone was used to assist the needy blind.

Few blind persons under 20 years of age were recipients of aid to the blind. Altogether the State studies included only 101 such recipients. Seven States reported none of this age, while the largest number was 27 in Oklahoma. In the 20 States only 12 recipients were children of less than 10 years, 14 were from 10 to 14 years, and 75 were from 15 to 19 years.

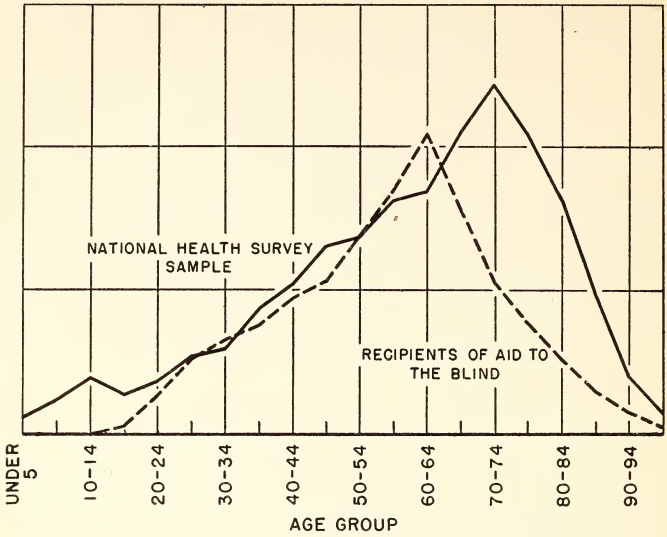
The age distribution of the recipients of each participating State at the time of the study is also shown in chart 2, where differentiation is made with respect to sex as well as age. The order of the States here is that of the total number of recipients. This chart is intended to serve several purposes. It shows strikingly the variation in size of the State contributions to the study population. It illustrates the consistency with which males predominate in the State recipient groups. It also contrasts the age distributions of male and female recipients in each State. In all but the small recipient groups of Rhode Island and Connecticut, males predominate except at the very young and very old ages. Although, generally, women exceed men in the general population beyond 70 years of age, it will be seen that in only a few States are women recipients more numerous than men in either of the two oldest age classes.

In chart 3 the age distribution of aid to the blind recipients is compared with that of the blind persons found in the National Health Survey. The two curves of this diagram have been located in such a way as to emphasize their similarity over the middle portion of the age span, within which the recipient figures are likely to be affected very little by the use of kinds of assistance other than aid to the blind. Over the age interval from 20 to 65 years the curves correspond approximately. But both below and above these ages the comparison with the survey sample indicates a large deficiency in the number of recipients.[6]

The failure sufficiently to represent blind children and adolescents and the greater failure to include enough blind persons over 65 years of age are probably the most important shortcomings of the recipient

[6] The deficiency may be even greater than that indicated, since there was probably some relative underenumeration of both very young and very old blind persons in the National Health Survey.

Chart 3.—*Comparison of the age distribution of recipients of aid to the blind and persons found blind in the National Health Survey*



sample. As already mentioned, some of the tabulations of the cause data have been adjusted to correct in some degree for this deficiency.

Degree of Blindness

The ophthalmic examinations required of applicants for assistance under the State-Federal programs have the primary purpose of determining whether or not the individual is blind in accordance with the definition of blindness adopted by the State. All the States included in the study have required examining physicians not only to report diagnostic information but also actual measurements, for each eye, of central visual acuity (acuteness of vision in the central portion of the retina, where in the normal eye vision is most perfect), and if there is reduction of the field of vision (the much larger and nearly circular area of the retina in which objects are visable when the eye is centrally focused), of its limitation.

The records of these measurements make possible a revealing classification of the recipients by degree of visual loss or, conversely, by extent of remaining vision. The results of this classification of the recipients of each of the participating States are given in table 8. Several facts concerning the figures of this table need to be explained.

The data of the table relate to the latest eye examination of each recipient preceding the date of the study. It is safe to assume that in

Table 8.—*Extent of remaining vision of recipients of aid to the blind, 20 States, in order of the proportion under 5/200*

[Italicized percentage represents the most frequently reported extent of vision for each State]

State	Number of recipients	Percentage distribution of recipients by extent of vision										Percent under 5/200
		Total	Absolute blindness	Light perception only	Motion perception to but not including 5/200	5/200 to but not including 10/200	10/200 to but not including 20/200	20/200	Better than 20/200 with field limitation—widest diameter subtends an angle of—			
									20 degrees or less	More than 20 degrees	Not specified	
Total, 20 States	20,591	100.0	*30.2*	25.9	20.2	8.5	7.0	6.4	1.0	0.5	0.3	76.3
Virginia	1,030	100.0	*48.8*	23.8	18.4	2.6	2.7	3.4	.3	.....	.....	91.0
North Dakota	231	100.0	28.2	*38.5*	21.2	3.5	6.5	1.3	.4	.....	.4	87.9
New Jersey	757	100.0	*35.6*	25.6	25.6	3.8	4.1	4.2	1.1	.....	.....	86.8
West Virginia	833	100.0	28.7	*35.2*	20.9	4.2	3.1	6.4	1.5	.....	.....	84.8
Arkansas	1,103	100.0	*34.6*	32.3	17.8	3.2	4.8	6.7	.3	.....	.3	84.7
Rhode Island	66	100.0	*34.9*	24.2	24.2	6.1	4.6	4.5	.....	1.5	.....	83.3
Connecticut	189	100.0	*37.1*	20.6	24.4	4.2	6.9	5.8	.....	.5	.5	82.1
New Hampshire	297	100.0	*32.7*	25.6	21.6	7.4	3.7	6.4	.3	.3	2.0	79.9
South Carolina	800	100.0	*42.6*	24.0	12.9	9.5	4.6	6.3	.....	.....	.1	79.5
Louisiana	1,165	100.0	*33.8*	20.3	24.5	10.0	6.0	3.3	.4	1.5	.2	78.6
Tennessee	1,526	100.0	*36.5*	24.8	16.9	8.2	6.0	3.5	.6	.5	3.0	78.2
Iowa	1,478	100.0	33.0	*39.2*	5.2	3.6	7.0	8.2	2.0	1.4	.4	77.4
Indiana	2,413	100.0	26.4	23.4	*26.6*	10.9	7.2	4.7	.8	.....	.....	76.4
Wisconsin	2,014	100.0	*31.0*	24.3	20.3	8.2	7.3	4.4	2.9	1.5	.1	75.6
Maryland	666	100.0	*31.2*	25.4	18.9	6.8	7.2	7.7	2.4	.3	.1	75.5
Massachusetts	1,176	100.0	25.6	*31.5*	18.0	7.3	7.2	8.6	.....	1.8	.....	75.1
South Dakota	265	100.0	30.2	*38.1*	4.2	3.4	8.3	13.2	2.6	.....	.....	72.5
Washington	1,053	100.0	22.3	19.9	*23.9*	12.7	8.1	7.0	.8	.1	.2	71.1
Oklahoma	2,141	100.0	21.0	*22.8*	21.7	15.3	10.9	7.9	.4	(1)	.....	65.5
Kansas	1,388	100.0	18.6	16.9	*23.8*	12.7	12.1	13.8	1.6	.5	.....	59.3

[1]Less than 0.05 percent

most cases the examination was relatively recent. But because defective vision generally becomes worse as time goes on, it is probable that if reexaminations had been made of all cases at the time of the study the average loss of vision would have been found somewhat greater than is indicated by the table.

The recipients are classified with respect to the extent of vision remaining, if any, in the better eye with corrective lenses. The several extent-of-vision categories do not constitute equal portions of the range of visual disability. In view of the nature of the eye tests, they are, however, convenient divisions for purposes of comparison. The apparent fractions used in several of the category titles should not be interpreted as true fractions. They are conventional notations for measurements of central visual acuity made by means of the standard Snellen chart for testing distance vision. In this form of notation the figure above the line indicates the distance — here expressed in feet — at which the subject recognizes letters or other symbols on the test chart which a person with normal vision would recognize at the distance indicated by the figure below the line.

The last three categories of the extent-of-vision classification of the table pertain to the limitation of field of vision of recipients whose central vision was better than the limit set by the accepted definition of blindness.

Some further description of the extent-of-vision categories may assist in interpreting the table:

Absolute blindness means entire lack of visual perception. The criterion for this classification is inability to recognize even strong light when shone directly into the eye.

Light perception only covers visual perception ranging from ability to distinguish strong light up to but not including ability to detect movement of the hand held at a distance of 3 feet from the eye.

Motion perception includes recognition of motion at a distance of 3 feet from the eye at the lower limit up to but not including a central visual acuity measurement of 5/200 on the Snellen chart. It is useful to recall that 5/200 central visual acuity was rated by the Committee on Compensation for Eye Injuries of the American Medical Association in 1925 [7] as equivalent to 99.9 percent loss of full visual acuity efficiency. This means that all persons included in the first three extent-of-vision categories are substantially without useful vision. It is of interest to note in this connection, also, that the Veterans Administration currently assigns a disability rating of 100

[7] "Appraisal of Loss of Visual Efficiency — Standard Method Approved by the House of Delegates of the American Medical Association, Atlantic City, N. J., May 26, 1925." *Extract* from Proceedings of House of Delegates, A. M. A., p. 3. The action taken by the House of Delegates was approval of a report of the Committee on Compensation for Eye Injuries of the Association's Section on Ophthalmology. A report of the Committee on Visual Economics of the Section on Ophthalmology in 1941 amended the earlier committee's report, but recommended the same schedule of loss of visual efficiency ratings corresponding to Snellen notations for central visual acuity. (*Transactions* of Section on Ophthalmology, American Medical Association, 92nd Annual Session, Cleveland, June 2–6, 1941, p. 331.)

percent to persons whose visual acuity measurement is 5/200 in the better eye.

5/200 to but not including 10/200. — Persons classified in this category are described as having "traveling sight" only. They are able to see at from 5 to just short of 10 feet what persons with normal vision see at 200 feet.

10/200 to but not including 20/200. — The lower limit of this category, or ability to see at 10 feet only what is normally seen at 200 feet, was rated by the American Medical Association Committee as equivalent to 96.7 percent loss of full visual acuity efficiency, while 20/200 was rated as equivalent to 80 percent loss — or 20 percent retained efficiency.

The category 20/200 includes only persons whose measurement of central visual acuity was at the upper limit constituting eligibility for assistance in the State-Federal programs of aid to the blind. This measurement, rated at 20 percent of full visual acuity efficiency, is approximately equivalent to ability to read printed matter in 14-point type, which is larger type than is ordinarily used in a printed book.

Field limitation. — Limitation of the field of vision is not considered in the classification by extent of vision unless the measurement of central visual acuity is better than 20/200. The recommendation of the Social Security Board has been that limitation of the field of vision to a diameter of 20 degrees at its widest point should be regarded as constituting occupational disability equivalent to that resulting from central visual acuity of 20/200. The table indicates that some State agencies recognize less limitation of field as constituting eligibility for assistance.

Of the total study population, 76.3 percent, or more than three-fourths, were classified as having less than 5/200 central visual acuity. The States are arranged in the table in order of this proportion, and it will be seen that it varies materially. Less than 10 percent of Virginia's recipients were reported as having as much as "traveling sight", while in Kansas the corresponding proportion was over 40 percent. The table justifies the conclusion that generally aid to the blind was being used at the time of the study chiefly for the assistance of persons who were without, or substantially without, remaining vision. The variation in the proportions of recipients having central visual acuity of 5/200 or more undoubtedly influences to an important extent the State classifications of recipients by cause of blindness.

The variation among the States in the classification of recipients by extent of remaining vision is also shown in chart 4, where all of the shaded portion of the bars represents persons with less than 5/200 central visual acuity.

Chart 4.—*Percentage distribution of recipients of aid to the blind by extent of remaining vision, 20 States*

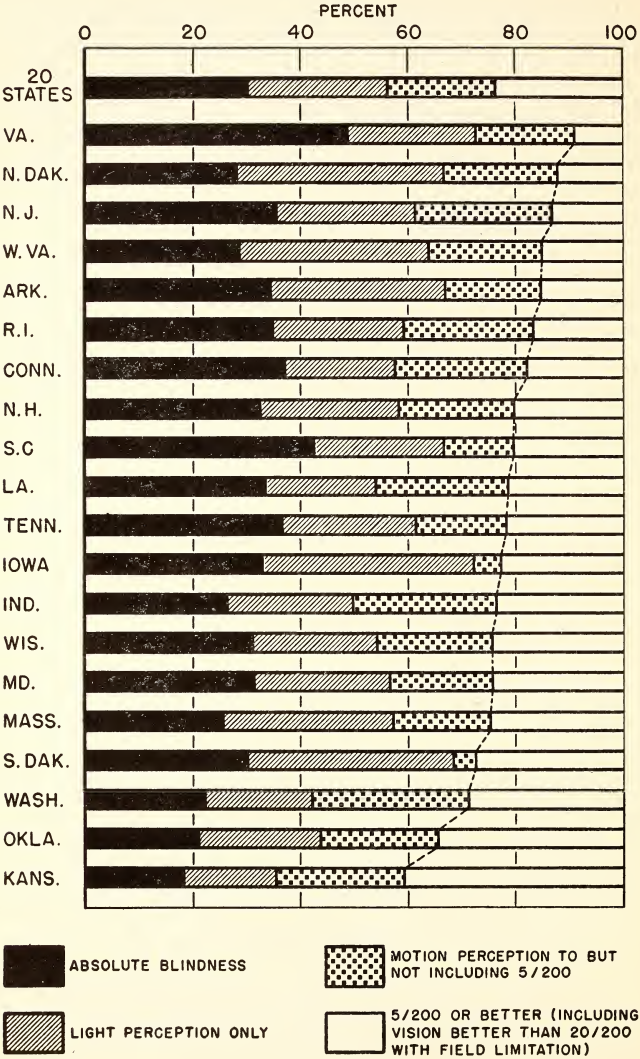
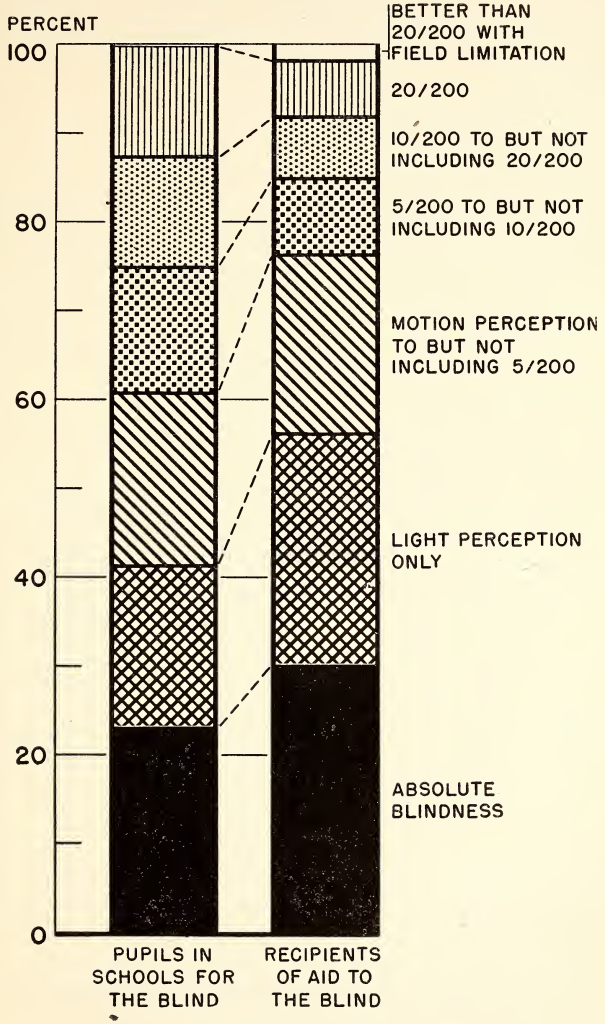


Chart 5.—*Percentage distribution of recipients of aid to the blind and of pupils in schools for the blind by extent of remaining vision*



In chart 5 the classification of the total group of recipients by extent of vision is compared with the corresponding division of pupils in schools for the blind.[8] This comparison suggests that generally the State agencies are more restrictive in their application of the definition of blindness in granting assistance than are the schools for the blind in acceptance of students as needing specialized education because of this handicap.

Age at Onset of Blindness

Fortunately, of the total blind population of this country, the proportion that has lacked sight since birth is small and is probably tending to become smaller year by year. Among most other blind persons — those who have had sight and lost it — it is probable that relatively few became blind abruptly. For a large majority of all blind persons the process of losing sight is likely to have extended over several years at least, while for many it was much longer. Loss of vision is likely to be gradual in most instances in which the cause is a degenerative condition, in many instances also that result from infectious diseases, and often in cases resulting from accidents.

On this account, and because the term blindness as commonly used is not a definite one, exact information concerning the age at which blindness of a particular degree was sustained is often not readily obtainable. Most blind persons, however, can fix approximately the age at which they began to experience serious disability because of loss of vision. The information on this point for recipients of aid to the blind should be much better than that obtained in a general survey of blind persons, inasmuch as it is obtained as part of the report of a medical examination. The information recorded usually represents, it may be assumed, the judgment of the examining physician after questioning the applicant and in the light of his diagnosis of the eye condition. In cases of doubt, facts obtained in the social investigation may also have assisted in determining the age recorded.

All the State agencies participating in the study requested as part of the physician's report the age at onset of blindness. This item is intended to refer uniformly to the age at which the applicant, or recipient, experienced loss of vision warranting his classification as blind according to the accepted definition. It was recorded for a very large proportion of the study population — 93.9 percent of the total number of recipients. The proportion was larger in 12 of the 20 States.

Table 9 compares the distributions of the recipients of the 20 States by recorded age at onset, or occurrence, of the handicap. To facilitate

[8] Kerby, C. Edith, "Eye Conditions Among Pupils in Schools for the Blind in the United States, 1940–41," *Outlook for the Blind, and the Teachers Forum*, Vol. 36, No. 5 (December 1942), pp. 270–276. The data cover pupils in 42 governmental and private residence schools for blind children and special classes for the blind of 7 State or large city public school systems. The total enrollment of these schools and classes at the time was 4,739 pupils, of whom 549 had better than 20/200 vision without peripheral limitation, while for the 66 the extent of vision was not reported. Chart 5 shows the classification of the remaining 4,124 pupils.

the comparison, wide age categories are used. The rank of the States is that of the percentage of recipients whose age at onset was 60 years or over. The important fact to register concerning this table is that the order of the States corresponds closely to that in table 7, relating to the present age of the recipients. By comparing the two tables, it will be seen that, as is to be expected, the classification of a recipient group by age at occurrence of blindness, as well as its classification by present age, is greatly influenced by the State practice concerning the choice of assistance program for providing aid to older needy blind persons. Obviously, if few or no persons over 65 years of age are assisted through the aid to the blind program, few or no recipients of such aid will have sustained blindness at an advanced age or even a few years earlier. Table 9, therefore, confirms the conclusion that the recipient groups of most of the States are not representative of all blind persons with respect to present age.

Table 9.—*Age at onset of blindness of recipients of aid to the blind, 20 States, in order of the proportion whose age at onset was 60 years or over*

State	Number of recipients	Percentage distribution of recipients by age at onset of blindness				
		Total	Under 20	20–59	60 or over	Unknown
Total, 20 States	20,591	100.0	25.4	50.3	18.2	6.1
Kansas	1,388	100.0	17.5	41.1	38.9	2.5
North Dakota	231	100.0	26.0	39.8	30.3	3.9
New Hampshire	297	100.0	19.5	36.7	28.6	15.2
Washington	1,053	100.0	15.4	40.0	27.4	17.2
Wisconsin	2,014	100.0	20.6	40.3	25.3	13.8
Indiana	2,413	100.0	25.4	49.2	23.1	2.3
Iowa	1,478	100.0	29.1	44.8	21.9	4.2
Arkansas	1,103	100.0	24.0	56.2	19.5	.3
Virginia	1,030	100.0	25.1	46.8	19.2	8.9
Massachusetts	1,176	100.0	29.1	52.1	17.2	1.6
Tennessee	1,526	100.0	28.3	47.2	11.1	13.4
West Virginia	833	100.0	35.8	48.7	10.0	5.5
New Jersey	757	100.0	21.4	67.5	9.7	1.4
Maryland	666	100.0	23.8	57.8	9.5	8.9
South Carolina	800	100.0	32.7	56.2	9.1	2.0
Louisiana	1,165	100.0	23.3	67.2	8.9	.6
Oklahoma	2,141	100.0	27.0	60.4	8.2	4.4
Connecticut	189	100.0	47.1	49.7	3.2	.....
Rhode Island	66	100.0	34.9	53.0	1.5	10.6
South Dakota	265	100.0	41.9	45.2	.8	12.1

With respect to age at onset of blindness, the distribution of recipients in Kansas is perhaps more likely than that of the other States to be representative of the total blind population. In Kansas, aid to the blind is given to older needy blind persons in preference to other forms of assistance; the number of recipients is reasonably large; and the percentage for whom age at onset was not recorded is small.

The onset of blindness of less than a fifth of the Kansas recipients was reported as prior to 20 years of age, of about two-fifths from 20

to 60 years, and about the same proportion at later ages. In table 10 the distribution of the Kansas recipients is compared with that of the total study population by means of smaller age-at-onset categories.

Table 10.—*Comparison of distribution by age at onset of blindness of all recipients and those of Kansas*

Age at onset of blindness	Percentage distribution of recipients	
	20 States	Kansas
Total	100.0	100.0
Under 1 year	10.3	7.2
1–9 years	7.8	5.4
10–19 years	7.3	4.9
20–29 years	8.5	5.6
30–39 years	11.2	8.1
40–49 years	14.1	10.7
50–59 years	16.5	16.7
60–69 years	11.5	19.8
70–79 years	5.3	15.7
80 years and over	1.4	3.4
Unknown	6.1	2.5
Median age at onset	41 years	54 years

Attention should be called especially to two facts concerning the Kansas group of recipients. One is that their average age at occurrence of blindness is relatively advanced. Their median age at onset was 54 years. Since their median age at the time of the study was 66 years, it appears that on the average they had been blind a relatively short time. Calculation from the reported data of the duration of blindness for the total group of recipients included in the study indicates that more than one-third had been blind for less than 10 years and more than a fifth between 10 and 20 years.

The second point of special interest concerning the Kansas sample is the proportion, 7.2 percent, who were either blind from birth or became blind within the first year after birth. In view of the advanced present age of the group, it may be presumed that most of those whose blindness occurred so early in life became blind at a time when many of the present preventive influences were not yet effective.

Chapter V.

METHOD OF CLASSIFYING CAUSES OF BLINDNESS

As has been said, the Standard Classification of Causes of Blindness prepared by the Committee on Statistics of the Blind has been used in this study to classify the diagnostic information on blindness.[1] The edition of the classification used is that published by the Committee in 1940, when it was revised on the basis of experience in application of the classification to large numbers of medical eye records, primarily those of children and adolescents in residence and day schools for the blind.

The classification is expressed in medical terminology generally used by practicing ophthalmologists, and makes use of three items of information concerning the cause of blindness, namely: the site of the pathological condition in the eye which prevents or reduces sight; the type or nature of the defect in the affected part of the eye; and the underlying cause or etiology of the condition.

The plan of classification is twofold. In one part, items relating to the site of the pathological condition, or the part of the eye affected, and those concerning the nature of the defect are combined, various types of abnormal condition being listed under each principal part of the eye. This provides the classification by site and type of affection. In the etiological portion of the classification, cases are distributed with respect to the cause of the abnormal eye condition. As is illustrated by this study, in an unfortunately large proportion of cases of blindness, even when diagnosed by physicians skilled in diseases of the eye, the cause of the eye defect cannot be assigned, either because of inadequacy of information available to the physician at the time of the examination or because the cause of the condition is not yet known to medical science.

Reason for Use of the Standard Classification of Causes of Blindness

Although the Standard Classified Nomenclature of Disease, which was being developed when the Committee's classification of causes was first formulated, has been satisfactorily applied to the diagnoses

[1] The Committee was established in 1930 jointly by the American Foundation for the Blind and the National Society for the Prevention of Blindness for the purpose of improving the statistics of blindness. It has consisted of the following members: Evelyn C. McKay, American Foundation for the Blind; Conrad Berens, M. D., New York Eye and Ear Infirmary; Lewis H. Carris, National Society for the Prevention of Blindness; Robert B. Irwin, American Foundation for the Blind; C. Edith Kerby, National Society for the Prevention of Blindness; Bennet Mead, U. S. Bureau of the Census and later U. S. Department of Justice; B. Franklin Royer, M. D.; Stetson K. Ryan, Connecticut Board of Education of the Blind; Ralph G. Hurlin, Russell Sage Foundation, chairman.

of blindness,[2] several considerations led to the choice of the Standard Classification of Causes of Blindness in this study.

In the present stage of recording by the numerous physicians who under widely varying conditions examine applicants for aid to the blind, the diagnostic information in the physician's report of eye examinations is often not wholly satisfactory. As stated in chapter II, the 20 States surveyed were admitted to participation in the project because of the relatively good quality of their medical eye records. Even in these States, however, there were marked differences in the availability of trained ophthalmologists to examine applicants for aid. For this reason, among others, the diagnostic information varied in completeness and adequacy. But even when the examinations are made only by adequately trained ophthalmologists, the diagnostic data cannot be uniformly complete and accurate. Inadequate medical histories and conflicting statements of applicants for aid to the blind regarding the circumstances of their handicap frequently prevent conclusive diagnoses. Difficulties of diagnosis are usually increased in conditions of long standing, and the eye lesions of blind persons when seen at the time of application for assistance often are well advanced, if not at a terminal stage.

The Standard Classified Nomenclature of Disease is extremely detailed and can probably be successfully applied to diagnoses of eye conditions only if all physicians diagnosing the conditions are familiar with it and the recording of their diagnoses can be supervised .These conditions did not apply in most of the States participating in the study at the time these data were compiled.

The classification of the Committee on Statistics of the Blind has, moreover, certain distinct advantages. One is that it brings together similar types of affection from whatever cause they result, offsetting in some measure the liability from inaccurate etiologies. It is obvious that identification of the type of condition in the eye that has resulted in loss of vision is likely to be accurate much more often than that of the factor that caused the condition. And, in turn, the part of the eye affected can be specified accurately more often than the specific nature of the condition. This method of classification brings together, first, cases in which a given part of the eye is affected, and within this grouping associates the cases of like types of affection. Cases of each type of affection are then further divided in the correlated etiological part of the classification.

When the two portions of the Standard Classification are related, as in the first appendix table of this study (table A-1), there is shown, within the limits of the adequacy of the underlying diagnoses, the relative importance of each specified etiology for each specified site and type of affection, and conversely the relative frequency with which each type of affection results from each tiology.

[2] For example see "Blindness in the State of New York," by Raymond L. Pfeiffer, M. D., and Alice O. Booth, *Archives of Ophthalmology*, Vol. 26, No. 1 (July 1941), pp. 85–97.

Statistical Treatment of Cases in Which the Cause Is Not the Same for Both Eyes

Usually, in the cases of persons blind in both eyes, the same condition and the same underlying factor or factors are responsible for the loss of vision in each eye. In an important proportion of cases, however, blindness of the two eyes occurs at different times and from different causes. This fact introduces a troublesome question with respect to the preparation of statistics of causes of blindness, concerning the answers to which there has not been entire agreement.

Several possibilities are presented. In some studies the tabulations have related to each eye that is blind. When this is done, the population studied is one of the eyes rather than of affected persons, and when the data relate to persons blind in both eyes, as in any study of recipients of aid to the blind, the number of units tabulated will obviously be twice as many as the number of persons concerned. This method is less logical than it may appear at first glance, since in preparing statistics of the causes of blindness the concern should properly be with the frequency of separate incidences of causes.

The tabulations of the present study relate to persons who are blind rather than to eyes. The instructions directed that in cases in which the two eyes became blind from different causes, information should be tabulated for the second eye to become blind. The present tables therefore relate specifically to the causes responsible for placing the persons studied in the category of economic blindness.[3]

Statistical Treatment of Multiple Diagnoses

Frequently, more than one abnormal condition capable of causing blindness is found in an affected eye. In these instances the recommended form for the physician's report of the eye examination calls for distinction between the lesion regarded as primarily responsible for loss of vision and the secondary condition or conditions. In applying the Standard Classification of Causes of Blindness the general rule is prescribed that in cases of multiple diagnoses the classification shall be according to the primary type of affection and its primary etiology.

The classification, however, includes some terms that refer to common combinations of conditions that may also occur singly. Most of them are combinations of similar conditions of closely related portions of the eye structure; for example, keratoiritis, iridocyclitis, uveitis, and chorioretinitis. Some terms are also included that refer to a later stage of a sequence, in which the site or type of the primary affection which itself might be capable of causing blindness is not implied by

[3] No information was tabulated concerning the first eye to become blind in those cases in which blindness of two eyes occurred at different times from different causes or from different incidences of the same cause, although this might well have been done in a separate tabulation. Cause data for the first eye to become blind, when the causes are different, should be tabulated separately if at all, inasmuch as blindness of only one eye occurs much more frequently (about four times as frequently according to the data of the National Health Survey) than blindness in both eyes, while the relative importance of different causes for blindness in only one eye and blindness in two eyes is quite different.

the stage identified. Such terms include ulceration and vascularization of the cornea, pannus, panophthalmitis, endophthalmitis, and disorganized eyeball.

In this study, judgment as to which was the primary eye defect or the primary etiology was primarily the responsibility of the examining physician. Not infrequently, however, the examiners' reports did not make a clear distinction between primary and secondary causes. In these and other questioned instances the supervising ophthalmologist who reviewed the medical data in preparation for the tabulations was asked to assume responsibility for assigning the diagnoses to be tabulated. Some guidance in interpreting the information contained in questioned reports was given in the rules for applying the classifications by both site and type of affection and etiology.

Concerning the Use of Distribution Percentages

Because much of the analysis of the cause data is made in terms of percentage distributions, two notes of caution need to be entered concerning them. The first is that although percentages to the first decimal place are shown in all tables, in order to reflect actual differences in the data as reported, significance should not be attached to small differences in the percentage figures, except as indicating that they were present in these particular data.

The second caution concerns a limitation that is inherent in percentage distributions. In a percentage distribution the frequencies of the component categories are related to their sum. From their nature it follows that the percentages of all the component categories are affected inversely by the size of all the other categories. If, in a given distribution, one category is for any reason abnormally large — or abnormally small — the percentage that each other category constitutes of the total is made thereby proportionally smaller — or larger — than it would otherwise have been. To cite an example, in the comparison of distributions of cases by etiology in table A–9, the percentage for trachoma for South Dakota is very high. As compared with the corresponding percentages in other States, the high percentage correctly points to, and approximately measures, the exceptional importance of trachoma as a cause of blindness among recipients in South Dakota. But the exceptionally high proportion for trachoma results in proportionally reduced percentages for each other etiological category.

For this reason, percentage distributions do not provide a fully satisfactory means of analysis. Rates which relate the cause data to a relevant independent variable are much to be preferred. In this study, however, a relevant independent variable to which to relate the data on blindness was not available. In the following discussion attention is called to some of the most important instances in which the results of the procedure used affect the comparisons made.

Basic Tabulations of Cause Data

For reference purposes, the detailed tabulations of statistics on site and type of affection and on etiology are presented in appendix A.

The first appendix table (A–1) is referred to here as a "master table." As already said, this table demonstrates the twofold character of the classification scheme, correlating the two distinct classifications. Its data are those of the combined 20 State studies. The cross-classification is presented in detail.[4] For each specified type of affection it is possible to determine here the number of recipients for whom different etiologies were assigned; and for each specified etiology the number of recipients for whom different types of affection were reported is similarly shown.

Appendix A contains, in addition to the master table, a series of supplementary tables, each presenting analysis of information concerning either the sites and types of affection or the etiologies.

Tables A–2 and A–8 summarize the correlated data of the master table in a form more convenient for many purposes. In table A–2 the percentage distribution by etiology is given of the cases of each site and type of affection category, and, conversely, table A–8 shows the percentage distribution by site or site and type of affection of the cases of each etiological category.

Tables A–3 and A–9 compare in terms of percentage distribution the results of the cause analyses found in the 20 State studies.

In the other tables the data of the 20 State studies are combined. In them, analyses of the reported cause data are made with respect to sex of recipients (A–4),[5] race (A–5 and A–10), present age (A–6 and A–11), and age at onset of blindness (A–7 and A–12).

In tables A–6 and A–11, the age data presented are those obtained as a result of the adjustment made to correct for the deficiency of the study sample in representation of both young and aged blind persons. A note explaining the method used in adjusting the age figures is contained in appendix B.

[4] This is the only tabulation which shows under the site and type of affection subclassifications for refractive errors, structural anomalies, and degenerative changes; and under etiology, subclassifications for ophthalmia neonatorum, syphilis, trauma, and poisonings.

[5] The analysis with respect to sex was made only for site and type of affection.

Chapter VI.

SITES AND TYPES OF AFFECTION

The relative importance in this study of the site, or topographical, categories is shown in table 11. The first column of percentages in this table is that obtained from the combined reported figures. The second column contains the percentages as modified by the age adjustment of the data. The order of the site-of-affection categories is that of the unadjusted percentages. It will be seen that only one change in the order of these categories results from the age adjustment of the figures; in the adjusted series of percentages the lens replaces the eyeball in general as the category of largest frequency.

Within each site-of-affection category, types of affection are arranged in order of the unadjusted percentages. In both columns the largest proportion of cases for any type of affection is that for cataract. When all forms of keratitis are combined, this general category becomes

Table 11.—*Distribution of recipients of aid to the blind by site and type of affection causing blindness*

Site and type of affection	Percentage distribution of all cases	
	Unadjusted for age	Adjusted for age
Total	100.0	100.0
Eyeball in general	22.8	23.2
Glaucoma	10.5	11.7
Degenerative changes	3.9	3.5
Refractive errors	3.4	3.1
Structural anomalies	2.0	2.3
Panophthalmitis and acute endophthalmitis	1.4	1.2
Other	1.6	1.4
Crystalline lens	19.7	24.6
Cataract	19.5	24.4
Dislocated lens	.2	.2
Other	(1)	(1)
Cornea	17.8	16.0
Keratitis, all forms, ulceration, vascularization and pannus	15.2	13.4
Other	2.6	2.6
Optic nerve, visual pathways and centers	16.8	14.7
Optic nerve atrophy	14.8	12.8
Retrobulbar and intracranial lesions	.5	.5
Other	1.5	1.4
Choroid and retina	12.8	12.4
Choroiditis, retinitis, and chorioretinitis	7.1	6.9
Retinal degeneration	3.3	3.0
Detached retina	1.1	1.0
Retinal hemorrhage	.6	.7
Other	.7	.8
Iris and ciliary body	7.7	6.8
Iritis, keratoiritis, iridocyclitis and uveitis	5.0	4.4
Sympathetic ophthalmitis	2.7	2.4
Other	(1)	(1)
Vitreous	.2	.1
Miscellaneous and ill-defined	2.2	2.2

[1] Less than 0.05 percent.

second in size. Optic nerve atrophy ranks third among types of affection, and glaucoma fourth; but these two categories would advance in rank to second and third place if the various forms of keratitis had been listed separately in this table, as they are in the detailed tabulations. Each of these four type-of-affection categories accounts for more than a tenth of all the cases, whether the adjusted or unadjusted percentages are considered.

Cataract

Cataract, or opacity of the crystalline lens, was found in this study, as it has been in others, to be the most frequently reported type of eye defect causing blindness. The 4,019 recipients for whom it was reported are 19.5 percent, or nearly a fifth, of the total number. When correction is made for the age deficiency in the study population, the proportion increases to 24.4 percent, or about a fourth of the adjusted total number. The increase in the percentage resulting from the correction for age is greater for cataract than for any other type of affection. This can be explained as due to the facts that cataract is the outstanding eye defect of old age and that the deficiency in the sample was mainly in the older age groups — because, as has been explained, some of the States use old-age assistance in preference to aid to the blind for older needy blind persons.

This category includes many kinds of lens opacity, but here as elsewhere in the cause tabulations the figures are intended to represent only conditions that arise independently of other eye affections. Cases in which cataract developed pursuant to another eye defect were classified, insofar as they were identified as such, under the primary condition.

Etiology. — While primary cataract may result from many different etiologies, including hereditary factors, trauma, poisons, infections, and such general diseases as diabetes and sclerosis of the blood vessels, the vast majority of lens opacities are those associated with the aging process, commonly referred to as senile cataracts. Since the cause of development of senile cataracts is obscure, their etiology in this study has usually been recorded as "unknown to science." For 70.7 percent of the reported cataract cases, the etiology was given as unknown to science; for 6.0 percent it was reported as undetermined or was not specified at all.

For 591, or 14.7 percent of all cataract cases, prenatal origin was the indicated etiology. It cannot be stated definitely how many of this number were diagnosed as cases of congenital cataract, but for as many as 464 cases the onset of blindness was reported to have occurred before the first birthday.

Traumatic cataracts were an important but relatively infrequent cause of visual loss among the recipients, 162 such cases being reported.

Diabetes was the assigned etiology for 105, or 2.6 percent, of the cataract cases. To various infectious diseases 48 cases were attributed, and to noninfectious general diseases other than diabetes 28 cases were assigned.

Sex as a factor. — Cataract was reported as the eye defect responsible for blindness of a materially larger proportion of the women than of the men. The percentages are 22.0 percent of the female recipients and 18.1 percent of the males. This difference is at least partly accounted for by the fact that more of the female than of the male recipients were of advanced age.

Race as a factor. — The percentages of cataract cases for white and Negro recipients differed more widely than those for males and females. For 20.8 percent of the white recipients, lens opacity was the reported type of affection as compared with only 14.9 percent of the Negroes. Here, also, the difference in average ages of the two groups concerned supplies part of the explanation.

Present age. — The adjusted-age figures indicate that more than 60 percent of persons blind as a result of cataract are 70 years of age or over, and that nearly 80 percent have reached age 60.

Of all the recipients who were 80 years or over, almost half were blind as a result of cataract, as were almost one-third of those 70–79 years and a fifth of those 60–69 years. Although the proportions are smaller for the lower age groups, cataract appears as a relatively important cause in all periods of life. The proportion of all cases of a given age attributed to cataract is lowest for blind persons in the age group 40–49 years.

Age at onset. — The information concerning age of occurrence of blindness of the recipients whose loss of sight was caused by cataract is summarized in the two following series of percentages taken from table A–7.

Age at onset of blindness	Percentage distribution of all cataract cases by age at onset	Cases of cataract as percent of all cases in each age-at-onset group
Total	100.0	19.5
Under 1 year	11.5	21.9
1–9 years	3.2	8.0
10–19 years	2.4	6.5
20–29 years	2.8	6.5
30–39 years	5.2	9.1
40–49 years	8.8	12.2
50–59 years	20.0	23.6
60–69 years	21.6	36.6
70–79 years	14.2	52.0
80 years and over	4.8	69.2
Unknown	5.5	17.5

Age at onset was reported for 3,799, or for all but 5.5 percent, of the cataract cases. Well over a tenth of these recipients were reported as being blind before they were a year old. The percentages for other

age groups up to 50 years are small, that for the decade 10–19 years being smallest. In more than 60 percent of these cases, blindness occurred after 50 years of age.

The second series of percentages registers the relative importance of cataract among other causes at each age of occurrence of blindness. It is the reported cause of 21.9 percent of all the recipient cases in which blindness occurred before 1 year of age. This proportion is much larger than that for any other type of affection causing blindness at this age. The importance of cataract relative to other causes of blindness is less during the later years of childhood and adolescence and during the early adult years but increases steadily thereafter, accounting for almost 70 percent of the cases of blindness occurring at age 80 or over.

State differences. — There is wide variation among the 20 States in the proportion of blindness attributed to cataract. Three States — Kansas, Wisconsin, and North Dakota — found that three-tenths of their recipients were without sight as a result of this defect, while for three others — New Hampshire, Virginia, and Washington — the proportion was over a fifth. Except for Indiana, which reported a surprisingly low proportion of cataract cases, these are the States having on their aid to the blind rolls the largest proportions of older blind persons. The States with low proportions of cataract cases generally have lower proportions of older recipients.

State	*Cases of cataract as percent of all cases*
20 States	19.5
*Kansas	30.8
*Wisconsin	30.6
*North Dakota	29.9
*New Hampshire	25.3
*Virginia	22.9
*Washington	20.3
West Virginia	18.7
Oklahoma	18.2
Louisiana	18.1
Connecticut	18.0
*Arkansas	17.7
*Iowa	17.6
Tennessee	17.5
South Carolina	16.4
Massachusetts	15.2
*Indiana	15.1
Maryland	12.3
South Dakota	11.7
New Jersey	10.2
Rhode Island	7.6

State in which more than one-third of the recipients were reported as 65 years or over. See table 7.

Optic Nerve Atrophy

Atrophy of the optic nerve in this study ranks second to cataract as an eye condition responsible for blindness, if the various forms of keratitis and their later stages are not combined as in table 11. It was the assigned type of affection for 3,056, or 14.8 percent of all the recipients in the 20 States. The correction for age deficiency in the study population lowers this proportion somewhat, the adjusted percentage being 12.8. These figures refer only to cases in which degeneration of the optic nerve was regarded as the primary eye condition causing blindness. In other instances this affection may have followed another eye condition that had already caused severe or complete loss of sight.

Etiology. — This defect is recognized as much the most common eye affection resulting from syphilitic infection, and it is not surprising that for as many as 30 percent of these cases syphilis was the assigned etiology. For a much larger proportion, 41.5 percent, either no entry was made concerning etiology or it was recorded as undetermined by the physician. Many of these cases also are likely to have resulted from syphilis, a probability considered in subsequent discussion of syphilis as a cause of blindness.

To factors of prenatal origin, including heredity, were attributed 5 percent of the cases of optic nerve atrophy. Various infectious diseases other than syphilis, including meningitis and septicemia, together account for more than 5 percent, and trauma for a somewhat smaller proportion. Noninfectious diseases were assigned as the etiology for nearly 7 percent of these cases, and poisons and new growths for approximately 2 percent each.

Sex as a factor. — Optic nerve atrophy was reported relatively much more frequently for male than for female recipients, the proportions being 17.2 and 10.9 percent. The importance of syphilis as an etiology of this defect and its probable higher prevalence among men in the past may fully account for this difference.[1]

Race as a factor. — Of the Negro recipients, 22.8 percent were recorded as blind because of optic nerve atrophy, as against only 12.8 percent of the white recipients.

Present age. — The adjusted-age figures of table A–6 indicate that in our present blind population most of those blind because of this affection are older persons. Almost two-thirds are indicated as having passed 50 years of age, but the proportions decline rapidly after the age group 60–69.

Relative to other causes, optic nerve atrophy is found to be important among blind persons of all ages, but its relative importance is greater for age groups under than for those over 50 years.

[1] See page 21.

Age at onset. — Age at occurrence of blindness was reported for about 94 percent of the recipients blind as a result of optic nerve atrophy. More recipients in this group, 21.2 percent, were stated to have become blind at ages 40–49 than in any other 10-year period. For about a fifth of the total number the onset of blindness was placed before the twentieth year.

Among all cases of blindness occurring before 1 year of age, optic nerve atrophy was the fourth most commonly reported type of affection. It ranked first among cases with onset at ages from 1–9, and in each of the four following decades up to 50 years of age.

State differences. — Although the States vary substantially in the proportion of their recipients for which this cause was reported, the variation here is much less than in the proportions of cataract cases. Here the mean and median percentages are practically alike, and for most of the States they are not very different. But Rhode Island, Maryland, and New Jersey reported proportions about twice those for Kansas, South Dakota, and New Hampshire and three times that for North Dakota.

It will be seen that six of the seven States with more than the average proportion of Negro recipients are in the upper half of the following list.

State	*Cases of optic nerve atrophy as percent of all cases*
20 States	14.8
Rhode Island	21.2
*Maryland	21.0
*New Jersey	20.4
Connecticut	19.1
*Louisiana	18.2
*Virginia	17.4
*South Carolina	17.1
Iowa	16.6
*Arkansas	16.1
Wisconsin	15.7
*Tennessee	14.3
Oklahoma	14.0
Indiana	13.6
Washington	12.7
Massachusetts	12.3
West Virginia	11.6
Kansas	10.6
South Dakota	10.5
New Hampshire	10.1
North Dakota	6.9

*State in which more than one-fifth of the recipients were Negroes. See table 6.

Glaucoma

The third most common type of affection shown in the detailed tabulations of the study is glaucoma. It was recorded for 2,170, or 10.5 percent of all cases. The correction for age increases the proportion to 11.7 percent.

The outstanding characteristic of this eye condition, or more correctly, this group of related conditions, is increased intraocular tension or pressure, which if not relieved leads usually within a relatively short time to total loss of sight. The developmental abnormality, hydrophthalmos or infantile glaucoma (megalophthalmos in the Standard Classification and tables of this report), should not, if the instructions on this point were followed, have been included in the category, but some such cases probably were included here. Glaucoma secondary to other lesions that cause blindness has been excluded, if so diagnosed.

Etiology. — Little is definitely known of the underlying causes of glaucoma, and for 95 percent of these cases the etiology was tabulated as unknown to science. This degree of uniformity was obtained partly because the study instruction directed that, unless the examining physician indicated a specific cause, the etiology of glaucoma should be so classified. A few cases were recorded as etiology undetermined by the physician or not specified. Fifty-eight cases were scattered among a wide variety of other etiologies.

Sex as a factor. — Proportionally more women recipients, 12.7 percent, than men, 9.2 percent, were found without sight as a result of this defect. This is consistent with the generally accepted belief that women are more subject than men to the most common form of the affection, known as chronic simple glaucoma. However, since glaucoma is associated with age, the somewhat higher proportion of older persons among the women may be at least part of the explanation of their higher proportion of glaucoma cases.

Race as a factor. — Negroes constituted about 20 percent of the total number of recipients, but they account for 29 percent of the glaucoma cases. This condition was reported for 15.2 percent of the Negroes, as compared with only 9.3 percent of the white recipients. This difference is not explained by differences in the sex or age composition of the two racial groups, since the sex ratios for Negro and white recipients are the same and a smaller proportion of Negroes are in the older age groups.

The proportion of glaucoma cases was substantially higher for Negro than for white recipients in every State having Negro recipients except Virginia, where the percentages for the two races were almost the same (11.2 and 11.7 percent), and North Dakota, which had only 2 Negro recipients. In the 11 States with more than 100 Negro recipients, the percentages of glaucoma cases for Negroes ranged from 8.5 in

West Virginia to 21.1 in Indiana, the median of the 11 percentages being 15.5.

For white recipients, the State glaucoma percentages show a strong tendency to vary with the proportion of elders among the recipients. For the 9 States with more than the average proportion of elders, the median proportion of glaucoma cases among white recipients was 11.2 percent; the range of the 9 percentages was from 8.2 in Kansas to 12.9 in New Hampshire. For the other 11 States the median percentage was 7.0; the range of their percentages was from 3.4 in South Dakota to 12.7 in New Jersey.

Present age. — The adjusted-age distribution shows that little blindness from glaucoma is to be expected among persons who are less than 50 years of age. More than three-fourths of the persons now blind from this cause should be found, according to these figures, among persons who have reached 60 years. Glaucoma was second in rank, following cataract, for the two age groups 70–79 years and 80 years and over, but shared second rank with optic nerve atrophy for age 60–69 years.

Age at onset. — Age at occurrence of blindness was reported for 94 percent of the glaucoma cases. Their distribution by age at onset shows the modal group of cases in the present age interval 50–59 years, with large proportions also in the two adjoining 10-year intervals. Well over eight-tenths of the recipients blind because of this condition for whom age at onset was reported were said to have become blind after reaching 40 years of age. Age at onset for about one-tenth was placed in the decade 30–39 years. For small proportions of these recipients, loss of sight was reported to have occurred in the lower age intervals. It is probable that some, if not many, of these cases should have been diagnosed as hydrophthalmos.

Among eye conditions causing onset of blindness at different ages, glaucoma ranks second in each 10-year age group after 40 years, following optic nerve atrophy at ages 40–49, and cataract thereafter. Its proportion of all cases is highest, about one-fifth, in the age-at-onset interval 60–69 years.

State differences. — The percentages of glaucoma cases for the States vary rather widely. The range is from only 3.4 percent for South Dakota to 15.0 percent for Maryland. Five of the States with more than average proportions of Negro recipients are among the first eight in the following list. The other three States high in the list — Indiana, New Hampshire, Washington — have large proportions of older recipients.

Other factors must influence this distribution of the States, however, for Kansas and North Dakota, with large proportions of older recipients, and South Carolina and Tennessee, with many Negroes, have relatively low proportions of glaucoma cases.

State	Cases of glaucoma as percent of all cases
20 States	10.5
*Maryland	15.0
*Louisiana	14.7
*New Jersey	13.9
Indiana	13.1
New Hampshire	13.1
Washington	12.9
*Arkansas	11.6
*Virginia	11.4
Wisconsin	11.3
Rhode Island	10.6
Iowa	10.3
Connecticut	9.5
Massachusetts	9.4
Kansas	8.7
*South Carolina	8.6
*Tennessee	8.3
North Dakota	8.2
Oklahoma	6.8
West Virginia	5.9
South Dakota	3.4

*State in which more than one-fifth of the recipients were Negroes. See table 6.

Affections of the Cornea

Cases in which lesions of the cornea of all kinds were reported as the primary eye condition leading to blindness numbered 3,656, or 17.8 percent of the total number. Correction for deficiency in the age distribution of the study population reduces this proportion to 16.0 percent.[2] This indication of a relatively large proportion of blindness resulting from corneal conditions has new significance, since it is among persons with these affections that are to be found the selected cases in which there is possibility of restoration of sight by means of corneal transplantation.

A large number of different conditions of the cornea capable of causing severe loss of sight are described, but many of them are not easily distinguishable. Many of these conditions, moreover, appear as causes of blindness relatively infrequently and if found in this study were not shown separately in the cause tabulations.

Various forms of keratitis, or inflammation and consequent change in structure of the cornea, constitute the majority of corneal defects. The results of serious inflammation of the cornea may be ulceration followed by formation of scar tissue, or vascular invasion of the cornea, or more often there is a combination of scarring and vascularization.

[2] It is possible, if not probable, that a substantial number of cases in which the primary eye condition causing blindness was an affection of the cornea were classified as panophthalmitis, endophthalmitis, or disorganized eyeball. The percentage found for affections of the cornea may, therefore, be somewhat too low.

In describing affections of the cornea, Graves advises that they cannot be classified readily and quotes Fuchs' statement that classification of inflammations of the cornea is artificial and cannot be attained without straining the facts.[3]

The study plan called for tabulation of corneal conditions recorded by examining physicians in eight categories. With the exception, perhaps, of interstitial keratitis and phlyctenular keratitis in its early stages, these categories are not sharply defined, so that little significance should be attached to the differences shown for them. They are discussed here as a group, and only interstitial keratitis is separately considered in a following section. The relative frequency with which cases were reported in the listed categories of corneal affections was as follows:

Type of corneal affection	Number of cases	Percentage distribution
Total	3,656	100.0
Ulcerative keratitis	1,277	35.0
Ulceration and vascularization	711	19.4
Pannus	545	14.9
Interstitial keratitis	232	6.3
Phlyctenular keratitis	18	.5
Keratitis, type not specified	331	9.1
Other affections specified	329	9.0
Affections not specified	213	5.8

The first six of the eight classes of corneal condition relate to either types or stages of keratitis, and such conditions are numerous also in the last two of the eight categories, as is shown by analysis of the assigned etiologies. It is, therefore, clear that some form of keratitis, involving ulceration and scarring, is the cause of loss of sight in almost all these cases.

The small number of reported cases of phlyctenular keratitis is of interest. Although this condition is not a common cause of blindness, the very small number of cases identified in the study may be misleading. Because the end result of this affection may be extensive ulceration and vascularization, or even the formation of a pronounced pannus, cases which belong in this category may readily have been tabulated in another.

Etiology. — Affections of the cornea causing blindness result from a great variety of etiologies. Preventable communicable diseases are still responsible for much of such blindness. But injuries, usually followed by infection, are also a common cause. Poisonings, noninfectious diseases, new growths, hereditary factors, and the degenerative processes of age may also seriously impair the function of the cornea.

Two-thirds of the present corneal cases were attributed to infectious diseases, trachoma alone accounting for 41 percent. To ophthal-

[3] "Diseases of the Cornea," *The Eye and Its Diseases*, edited by Conrad Berens, M. D., 1938, p. 501.

mia neonatorum were credited 8 percent and to syphilis 5 percent. Only 52 of these cases were attributed to gonorrhea other than ophthalmia neonatorum. Very small numbers, varying from only 1 to 38, were reported for other communicable diseases, including tuberculosis, smallpox, measles, typhoid fever, scarlet fever, meningitis, and diphtheria. Forty-one cases were attributed to septicemia.

For 344, or 9.4 percent of the corneal cases, trauma was the assigned etiology. For a fifth of these cases the etiology was reported as undetermined by the physician or else was not recorded at all.

Of the large number of trachoma cases, 599 were reported as ulceration and vascularization, 529 as pannus, 265 as ulcerative keratitis, leaving 107 cases scattered in other type-of-affection categories. Trachoma cases comprised 97 percent of all cases classified as pannus, 84 percent of those classified as ulceration and vascularization, and 21 percent of cases classified as ulcerative keratitis.

Ulcerative keratitis was the most frequently recorded type of affection for most of the other specific etiologies.

Sex as a factor. — Affections of the cornea were reported for closely similar proportions of the male and female recipients. It is doubtful if significance can be attached to the differences between the sexes in the proportions shown in table A–4 for the several types-of-affection categories, except the larger proportion of interstitial keratitis cases for the females, to which attention is called in the following section.

Race as a factor. — A much larger proportion of corneal affections was found among white (18.9 percent) than among Negro recipients (13.5 percent). This difference is explained by the recognized difference in susceptibility of the two racial groups to trachoma, the major etiology of the cases of corneal defect. This is reflected in the very small proportions of pannus and of ulceration and vascularization cases among the Negro recipients. The Negro proportion of ulcerative keratitis cases is practically the same as that for white recipients because of relatively larger numbers of these cases due to other etiologies.

Present age. — The adjusted figures of table A–6 indicate that the modal age group for persons now blind because of affections of the cornea is 60–69 years.

Recipients whose eye condition was diagnosed as interstitial keratitis had a much lower average age than other recipients with corneal affections.

Age at onset. — Nearly 12 percent of the recipients whose loss of sight was attributed to corneal defects were found to have become blind under 1 year of age and nearly a fourth under 10 years of age. Thereafter, occurrence of blindness because of these affections was spread rather evenly over the decades up to 60 years. The concentration below 10 years is most marked in the three categories of ulcerative keratitis, keratitis not specified, and affections of the cornea not specified.

Corneal affections account for a fifth of all cases of blindness occurring under 1 year of age, for almost 30 percent of all cases occurring from ages 1-9, and for more than a fourth of all cases occurring under 30 years, ulcerative keratitis being the most common type of affection for these ages. The importance of corneal conditions relative to other types of affection decreases progressively with age.

State differences. — Among the 20 States, the proportion of cases of blindness attributed to corneal conditions varied from only 8.1 percent for Maryland to 40.8 percent for South Dakota. The States with highest proportions of these defects are those in which larger proportions of trachoma cases were reported.

In the following tabulation the States are arranged in order of the total percentage of reported corneal conditions, but percentages are also shown for the three most frequently reported types of affections, for all other specified corneal conditions including interstitial keratitis, and for two "not specified" categories combined. These figures show strikingly the variation in the use of the several categories of corneal conditions.

South Dakota reported no cases of ulcerative keratitis, but relatively large numbers both of ulceration and vascularization and of pannus cases. Oklahoma and Arkansas, both of which like South Dakota had many trachoma cases, distributed them among the three major categories but reported them most frequently as ulceration and vascularization. On the other hand, Indiana reported ulcerative keratitis as the type of affection for most of its trachoma cases. Indiana reported relatively few cases of pannus, while Tennessee and Wisconsin made no use of the category ulceration and vascularization.

Cases of corneal affection as percent of all cases

[Italicized percentage represents the most frequently reported type of corneal affection for each State]

State	All corneal affections	Ulcerative keratitis	Ulceration and vascularization	Pannus	All other specified corneal affections	Corneal conditions not specified[1]
Total, 20 States	17.8	*6.2*	3.5	2.7	2.8	2.6
*South Dakota	40.8	.....	*19.6*	17.4	2.3	1.5
*Oklahoma	35.4	9.2	*14.7*	5.9	1.6	4.0
*Arkansas	25.2	4.0	*11.5*	7.0	2.0	.7
*Indiana	19.5	*11.1*	4.0	1.2	2.7	.5
Tennessee	19.0	*13.1*	.....	2.6	2.9	.4
*West Virginia	18.7	3.1	*7.0*	6.8	1.7	1.7
*North Dakota	18.6	.9	2.2	5.2	*8.2*	2.1
Iowa	16.7	5.1	.1	*5.9*	1.9	3.7
Massachusetts	15.9	*9.7*	2.0	.8	3.2	.2
*Kansas	15.2	*4.7*	4.5	1.1	2.6	2.3
Louisiana	15.0	*6.8*	.2	1.1	3.6	3.3
South Carolina	14.5	*7.6*	.1	.1	3.0	3.7
Rhode Island	12.1	1.5	1.5	.....	3.0	*6.1*
New Jersey	11.7	3.2	2.0	.6	*3.3*	2.6
Connecticut	10.6	4.2	.5	.....	*5.9*	.....
Wisconsin	10.5	2.7	.....	.7	3.5	*3.6*
Virginia	10.4	.4	.2	.1	2.0	*7.7*
Washington	9.9	2.1	.2	1.2	1.4	*5.0*
New Hampshire	8.7	*3.3*	.7	.....	1.7	3.0
Maryland	8.1	*3.5*	.3	.....	2.2	2.1

*State with more than average proportion (7.5 percent) of recipients blind because of trachoma.
[1] Includes keratitis, type not specified.

For half or more of the cases of corneal defect of Rhode Island, Virginia, and Washington the type of affection was either not specified at all or only as keratitis.

Interstitial Keratitis

In interstitial keratitis, inflammation of the deeper layers of the cornea is followed by clouding and in variable degree by vascularization of the corneal tissue. The disease has been known in the past as a common cause of blindness. It occurs today less frequently than formerly, largely because of improved prenatal care. In this study relatively few cases of interstitial keratitis were reported. Only 232 cases, or 1.1 percent of the total number, were so identified.

Etiology. — Prenatal syphilitic infection is recognized as the predominant but not the exclusive cause of this eye condition. It may also result from postnatal syphilitic infection, while other infections are described as possible causes. Syphilis was the assigned etiology for only 61.6 percent of the cases reported, but for 31.0 percent the etiology was recorded as undetermined or else no entry was made concerning etiology. Four cases were attributed to septicemia, 3 to tuberculosis, 1 to measles, and 3 to trauma. Of the cases attributed to syphilis, 13 were reported as resulting from infection after birth.

Sex as a factor. — Interstitial keratitis has usually been described as occurring more frequently among females than among males. This result appears also in this study. The condition was reported for 1.5 percent of the female recipients in contrast to only 0.9 percent of the males.

Race as a factor. — A much larger proportion of the Negro recipients was reported blind because of interstitial keratitis (2.1 percent) than of the white recipients (0.9 percent). The difference is consistent with the generally greater prevalence of syphilis among Negroes. There was almost the same relative difference between the percentages of interstitial keratitis cases for the sexes of the two races. The percentages were: white males, 0.7; white females, 1.2; Negro males, 1.6; Negro females, 2.9.

Age at onset. — Interstitial keratitis, when caused by infection acquired before birth, usually appears only after an interval of at least several years. The most frequent age of appearance of the condition has been said to be between 5 and 20 years. For more than 45 percent of the cases here reported, the age of occurrence of blindness was placed prior to 20 years of age. It is surprising that nearly a fifth were reported to have become blind after 40 years of age.

State differences. — No State reported many cases of interstitial keratitis. The numbers varied from only 2 each for New Hampshire, Rhode Island, and North Dakota to 28 cases for Louisiana and 29 for Tennessee. The highest proportions of these cases are those for Connecticut and Rhode Island, which have the smallest total numbers of

cases. Most of the States in the upper half of the following list are States having relatively large proportions of identified syphilis cases. Nine of the States reported a specific etiology other than syphilis for one or more cases of interstitial keratitis.

State	*Cases of interstitial keratitis as percent of all cases*
20 States	1.1
Connecticut	4.3
Rhode Island	3.0
*Louisiana	2.4
*New Jersey	2.4
West Virginia	2.3
*Tennessee	1.9
South Dakota	1.5
Massachusetts	1.4
*Maryland	1.4
*Arkansas	1.1
*South Carolina	1.0
Indiana	.9
Iowa	.9
North Dakota	.9
*Virginia	.7
New Hampshire	.7
Oklahoma	.6
Wisconsin	.5
Washington	.5
Kansas	.4

*State in which more than one-fifth of the recipients were Negroes. See table 6

Affections of the Iris and Ciliary Body

The plan of classification combines affections of the iris and the ciliary body, because these adjoining and structurally closely similar portions of the uvea, or uveal tract — the vascular middle layer of the wall of the eyeball — are so often affected simultaneously by the same disease. Very often, also, an affection of the ciliary body, or of both the iris and ciliary body, may involve at the same time the much larger posterior portion of the uvea, the choroid, as in the commonly diagnosed condition, uveitis. Cases of uveitis are here classified with other affections of the iris and ciliary body rather than with affections of the choroid.

Much the most frequent defects of the uveal tract are those resulting from inflammatory processes, the causes of which may be extremely varied and which are frequently difficult or impossible to diagnose accurately. Loss of vision resulting from these conditions is caused usually by secondary affections in other parts of the eye. Among the secondary defects causing blindness which may follow uveal lesions are, among others, glaucoma, opacities of the cornea, lens, or vitreous,

either atrophy or detachment of the retina, and atrophy of the optic nerve.

Of the cases studied, 1,594 or 7.7 percent were attributed to primary affections of the iris and ciliary body, or of the uveal tract as a whole. The correction for age distribution of the recipients reduced this percentage to 6.8.

The distribution of these cases by recorded type of affection was as follows:

Type of affection of the iris and ciliary body	Number of cases	Percentage distribution
Total	1,594	100.0
Iridocyclitis or uveitis	755	47.4
Sympathetic ophthalmitis	552	34.6
Iritis	185	11.6
Keratoiritis	96	6.0
Other affections specified	3	.2
Affections not specified	3	.2

Nearly half of these cases were reported as iridocyclitis or uveitis, and a little more than a third as sympathetic ophthalmitis, which is itself a form of uveitis. Much smaller numbers of cases were recorded in the two closely related categories, iritis and keratoiritis. Either very few or no cases of the latter designation were reported by more than half the States. The very few cases both of other specified uveal affections and of affections not specified are of interest.

Etiology. — That trauma was the most frequently recorded etiology for this group of defects is not surprising in view of the large number of cases identified as sympathetic ophthalmitis. A perforating wound is recognized as the most common, but not the only, initial cause of this condition, in which uveal inflammation is set up in the second eye following, and evidently only as a result of, involvement of the other eye. In this study, all but 31 of the 552 cases of sympathetic ophthalmitis were reported to have resulted from trauma. Trauma was also the reported etiology of 9 percent of the other cases in this general category.

For three-tenths of these cases — or more than four-tenths of those other than sympathetic ophthalmitis — etiology was recorded as undetermined or else no entry was made concerning it. This again is not surprising in view of the difficulty of differentiating these conditions accurately. Almost the same proportion was attributed to infections, but of these cases only about half were credited to a specific infectious disease. Syphilis was specified for 143 cases, septicemia for 78, tuberculosis for 36, and measles for 10. One or more cases were also attributed to gonorrhea, meningitis, typhoid fever, scarlet fever, smallpox, and trachoma. A noninfectious general disease was assigned as the etiology of 35 of these cases.

Sex as a factor. — Affections of the iris and ciliary body were reported for 8.3 percent of the male, but for only 6.9 percent of the female, recipients. The difference between these proportions is more than accounted for by cases of sympathetic ophthalmitis, for which, as would be expected, the sex ratio was strongly in favor of the men. This type of affection was recorded for only 1.5 percent of the women but for 3.4 percent of the men.

Race as a factor. — Cases in this category were recorded relatively much more frequently for the Negro than for the white recipients. Here, however, the difference is not accounted for by difference in the number of cases of sympathetic ophthalmitis. Instead, the proportions of such cases for the two races were almost the same — for white recipients, 2.7 percent; for Negroes, 2.5 percent. Other affections of the iris and ciliary body or of the uveal tract as a whole were reported relatively more than twice as often for Negroes as for whites.

Present age. — Table A–6 indicates that the distribution by present age of persons blind as a result of these affections resembles that of all blind persons, except that the proportions are smaller in the older age groups.

The relative frequency of these conditions as compared with other types of affection declines after 50 years of age, but this decrease is the result of the large increase in relative importance among older persons of cataract and glaucoma. According to this table, sympathetic ophthalmitis may account for 3–4 percent of the blindness of persons in the age groups under 50 years, and of increasingly smaller proportions in the older age groups.

Age at onset. — Blindness resulting from these conditions occurs throughout the life span. The cases studied in this category were rather evenly distributed by age of occurrence — roughly 13–15 percent in each one of the first six decades. The number of these cases occurring after 80 years was very small.

The occurrence of blindness from sympathetic ophthalmitis is most concentrated in the first two decades, the frequency gradually declining from 20 years of age to very small numbers after age 70.

State differences. — Here also, much variation is shown by the State figures with respect to both the relative frequency of cases in the general category and their distribution by type of affection. In only 10 of the State studies were cases of iridocyclitis or uveitis recorded more frequently than cases of sympathetic ophthalmitis, while for 5 States — West Virginia, Arkansas, Iowa, Wisconsin, and South Dakota — cases of sympathetic affection outnumbered all other cases in the general category.

In the following tabulation the States are listed in order of the percentages for all affections of the iris and ciliary body. Six of those in the upper half of the list have considerably more than the average proportion of cases of sympathetic ophthalmitis, and these States,

as would be expected, reported relatively high proportions of cases resulting from trauma, as did also Louisiana and Virginia. The two latter States, with low proportions of sympathetic cases had higher percentages of iridocyclitis and uveitis than did any of the other States.

Cases of affections of the iris and ciliary body as percent of all cases

[Italicized percentage represents the most frequently reported type of affection of the iris and ciliary body for each State]

State	All affections of iris and ciliary body	Sympathetic ophthalmitis	Iridocyclitis and uveitis	Iritis and keratoiritis	Other specified and not specified
Total, 20 States	7.7	2.7	*3.7*	1.3	(1)
West Virginia	13.3	*9.3*	3.2	.8	.....
South Carolina	12.9	*6.0*	4.6	3.3	.....
Louisiana	11.8	.8	*8.4*	2.6	.....
Tennessee	11.0	3.6	*4.1*	3.3	.....
Virginia	10.4	2.0	7.7	.6	0.1
New Hampshire	9.8	*4.1*	2.7	3.0	.....
Connecticut	9.5	*4.2*	2.6	2.7	.....
Arkansas	8.7	*6.6*	2.3	.8	.1
New Jersey	8.7	1.7	*6.6*	1.4	.....
Massachusetts	8.5	1.5	*6.6*	.4	.....
Indiana	8.1	1.8	*4.2*	2.1	.....
Maryland	7.8	2.2	*4.7*	.9	.....
Washington	6.5	1.5	*3.7*	1.3	.....
Oklahoma	5.1	1.4	*3.4*	.3	.....
Iowa	4.9	*2.8*	1.4	.6	.1
Kansas	4.5	*2.2*	.7	1.6	.....
Rhode Island	4.5	1.5	*3.0*	.....	.....
Wisconsin	4.2	*2.8*	.6	.8	(1)
North Dakota	2.2	.9	*.9*	.....	.4
South Dakota	1.5	*1.1*	.4	.....	.....

[1] Less than 0.05 percent.

Affections of the Choroid and Retina

This topographical category includes a large variety of conditions which involve one or, more frequently, both of these two structures, which are the middle and inner layers of the wall of the posterior portion of the eyeball. As already pointed out, affections of the choroid which were diagnosed as either sympathetic ophthalmitis or uveitis because of simultaneous involvement of the ciliary body should, according to the plan of this study, have been classified with affections of the iris and ciliary body. It is clear that in many instances, in making diagnoses of the end results of these eye affections, distinction between types of affection could not be made readily. An important amount of overlapping is therefore to be expected between the categories of uveitis and choroiditis, choroiditis and chorioretinitis, and chorioretinitis and retinitis. Recognition is especially needed here of the fact that, unless diagnoses are made during the active stages of an eye affection, accurate specification of the primary condition is frequently impossible. These difficulties may account for much of the variation among the States in the figures for this group of eye affections.

Affections of the retina or choroid other than uveitis, or of both structures, were reported for 2,635 or 12.8 percent of the recipients.

The correction for age distribution changes this proportion very little, the corrected percentage being 12.4.

By nature of affection, these cases were distributed as follows:

Type of affection of the choroid and retina	Number of cases	Percentage distribution
Total	2,635	100.0
Chorioretinitis	763	29.0
Retinal degeneration	687	26.1
Choroiditis	378	14.3
Retinitis	318	12.1
Detached retina	220	8.4
Retinal hemorrhage	127	4.8
Arteriosclerotic disease	82	3.1
Other affections specified	43	1.6
Affections not specified	17	.6

It will be seen that the three kinds of conditions signifying primary inflammatory processes in one or both of these structures — chorioretinitis, choroiditis, and retinitis — account together for well over half of these cases, while retinal degeneration is credited with more than a fourth. The latter category includes an unspecified number of cases of the not uncommon inherited defect, retinitis pigmentosa. Cases reported as detached retina were relatively few, but it should be emphasized that cases in which diagnosis indicated detachment of the retina secondary to choroiditis were, presumably, classified usually in the latter category, and cases which were interpreted as secondary to myopia were usually classified as caused by myopia. Retinal hemorrhage, arteriosclerotic lesions, and all other specified types of affections account for about 10 percent of all cases in the general group.

Etiology. — The causes of serious alterations in these structures are extremely varied and are often, under the most favorable circumstances, difficult or impossible to identify. It is understandable, therefore, that for almost a third of these cases etiology was recorded as undetermined or was entirely unspecified, while an additional 13 percent were entered as unknown to science. Noninfectious diseases were specified for 17.8 percent of the cases, infectious diseases for 16.3 percent, prenatal influences other than infections for 14.3 percent, and trauma for 5.6 percent. Syphilis was specified as a cause of these conditions much more often than any other infectious disease.

Of the 687 cases of retinal degeneration, 37 were reported as of established hereditary origin and 159 as of presumed hereditary origin. Altogether 237 cases of established or presumed hereditary defect were reported in the general category of affections of the choroid and retina.

Noninfectious general diseases were much more frequently diagnosed as the etiology of defects of the retina and choroid than of any other parts of the eye. Vascular diseases and diabetes were the most frequently recorded general diseases.

Sex as a factor. — These cases comprised similar proportions of the total cases of male (13.2 percent) and female (12.1 percent) recipients. Among the subdivisions of the category the greatest difference in the proportions for the two sexes was found for cases of detached retina. This type of defect was recorded relatively nearly twice as often for males as for females, traumatic cases accounting for at least part of the difference.

Race as a factor. — These affections were reported relatively much more often for white recipients (14.0 percent) than for Negroes (8.2 percent). The percentages of total cases are larger for the white race in the case of each of the type-of-affection categories. The differences are greatest for retinal degeneration, arteriosclerotic disease, and retinal hemorrhage. It is probable that the difference in ages of the white and Negro recipients explains some of the apparent racial difference.

Present age. — For the entire group of these affections, the distribution of cases by present age is closely like that of all cases. Cases of arteriosclerotic disease and of retinal hemorrhage tend to be older and those of detached retina and retinal degeneration somewhat younger than those in the other type-of-affection categories.

These cases are from 10 to 15 percent of all cases in each present age class.

Age at onset. — The distribution of cases of affections of the choroid and retina by age at onset of blindness also resembles closely the corresponding distribution of the total group of recipients. Somewhat less than half of the blindness in this general category had its onset in the three decades from 30 to 60 years, and this statement holds good for most of the subdivisions. But blindness from arteriosclerosis and retinal hemorrhage occurred chiefly after age 40, and that from retinal degeneration chiefly before that age. Thirteen percent of the cases of retinal degeneration were reported to have become blind when less than a year old.

State differences. — The differences among the States in the distribution of cases within this general group are much more striking than those in the percentages of all cases assigned here. Massachusetts, with the largest proportion of these cases (18.5 percent), had relatively more than twice as many as Arkansas, which had the smallest proportion (7.1 percent). Both these States reported relatively few cases of either choroiditis or retinitis. The most frequently recorded of these types of affections in 10 of the States was chorioretinitis, while in 8 States it was retinal degeneration. The latter diagnosis was made for 5 percent or more of all cases in North Dakota, Maryland, and Massachusetts, and reached almost that proportion in Wisconsin and Indiana.

Most of the States with more-than-average proportions of Negro recipients are in the lower portion of the following tabulation.

Cases of affections of the choroid and retina as percent of all cases

[Italicized percentage represents the most frequently reported type of affection of the choroid and retina for each State]

State	All affections of choroid and retina	Choroiditis	Retinitis	Chorioretinitis	Detached retina	Retinal degeneration	All other
Total, 20 States	12.8	1.8	1.6	*3.7*	1.1	3.3	1.3
Massachusetts	18.5	.3	.1	*5.1*	2.1	5.0	5.9
North Dakota	16.9	2.6	2.6	2.6	1.7	*5.6*	1.8
*New Jersey	16.8	2.0	1.7	*5.3*	2.0	4.3	1.5
Rhode Island	16.7	*6.1*	.....	4.6	3.0	1.5	1.5
Iowa	16.1	2.4	3.3	*4.6*	1.3	3.8	.7
Washington	16.0	2.7	2.6	3.3	1.6	*3.5*	2.3
Indiana	14.6	2.2	1.7	3.9	1.2	*4.3*	.8
*Maryland	14.4	2.0	1.3	4.4	.6	*5.6*	.5
Connecticut	14.3	.5	3.2	3.2	2.1	*4.2*	1.1
Kansas	14.1	2.4	1.9	3.3	.4	*3.6*	2.5
Wisconsin	13.5	.8	2.4	2.9	1.0	*4.9*	1.5
West Virginia	13.1	2.4	1.8	*4.7*	1.0	2.5	.7
New Hampshire	12.5	1.4	1.4	2.3	1.0	*3.0*	3.4
South Dakota	10.9	.8	.8	*6.0*	.....	3.3	.....
*Louisiana	10.6	1.5	.7	*5.2*	.7	2.3	.2
*Virginia	10.6	.8	1.1	*4.4*	.6	2.5	1.2
*Tennessee	10.5	*3.7*	1.0	2.7	1.0	1.4	.7
*South Carolina	8.7	2.1	1.5	*2.4*	1.3	.6	.8
Oklahoma	8.2	1.7	.9	*2.6*	.8	2.1	.1
*Arkansas	7.1	.7	.5	*3.0*	.5	1.5	.9

*State in which more than one-fifth of the recipients were Negroes. See table 6.

Refractive Errors

The assignment of refractive error as a type of affection responsible for blindness could mean, in accordance with the instructions for the study, either that the fault of refraction alone was sufficient to reduce vision, with correction, to the extent recognized as constituting blindness; or that the refractive error itself, or some unidentified factor associated with it, produced a change in a visually essential structure, which was the immediate cause of blindness. For example, many ophthalmologists believe that tears in the retina and its subsequent detachment can be the direct result of myopia. The instructions for this study, in fact, drew attention to this possible sequence of events and suggested that if both detached retina and a high degree of myopia were diagnosed, myopia should be recorded as the cause of blindness.[4] In some instances, atrophy of the choroid or of the retina, and in others formation of cataract as well as other degenerations, have been considered changes resulting from refractive error.

In this study, refractive errors were recorded as the primary type of affection causing the blindness of 708 recipients, or 3.4 percent of the total number. For all but 31 of these cases, myopia was the specified fault of refraction.

Etiology. — The factors underlying the development of refractive errors and associated changes are not yet sufficiently understood. Usually, therefore, the etiology of such cases was reported as unknown to science. This entry was made for two-thirds of the cases, while for

[4] It should be noted that some authorities hold that detachment of the retina follows a moderate myopia more often than myopia of high degree. See "Detachment of the Retina," *The Eye and Its Diseases*, edited by Conrad Berens, M. D., 1938, p. 769.

most of the other third prenatal origin was recorded. In some States the latter notation was used in indicating the etiology of all, or nearly all, cases of myopia. Heredity was reported as an established causal factor in only 12 cases and as a presumed factor in 33 others.

Sex as a factor. — Refractive errors were recorded in the cases of 3.3 percent of the male and 3.7 percent of the female recipients. Significance cannot be attached to this difference.

Race as a factor. — This type of affection was reported much more frequently for white than for Negro recipients, the corresponding proportions being 4.0, and 1.1 percent. This difference may well reflect an actual and important racial difference in liability to blindness from this cause.

Age at onset. — The distribution of these cases by age at onset of blindness is bi-modal. Nearly 14 percent of the cases were reported to have been blind before reaching 1 year of age. With advancing age, the proportions fall off, then increase to roughly 15 and 16 percent in the decades 40–49 years and 50–59 years. The percentages are again small after age 60.

Refractive errors were recorded as the cause of blindness in 4.6 percent of all cases with onset of blindness before 1 year of age.

State differences. — Northern States tend to be high and Southern States low in the following list. The most important explanatory factor appears to be the relative number of Negroes among the recipients. Five

State	*Cases of refractive errors as percent of all cases*
20 States	3.4
Massachusetts	8.5
Connecticut	7.9
Rhode Island	7.6
Washington	6.4
*New Jersey	5.7
New Hampshire	5.1
South Dakota	4.5
*Maryland	4.4
West Virginia	3.9
Indiana	3.6
Iowa	3.5
Wisconsin	3.4
Kansas	3.0
*Tennessee	2.8
North Dakota	2.6
*Louisiana	2.0
Oklahoma	1.9
*South Carolina	1.8
*Virginia	.9
*Arkansas	.4

*State in which more than one-fifth of the recipients were Negroes. See table 6.

of the seven States with more than the average proportion of Negro recipients are among the seven reporting the smallest proportions of cases of refractive error. But Maryland and New Jersey, which also have more than the average number of Negroes, are in the upper half of this list. It is of interest to note that the New England States and New Jersey are high in this list, as they tend to be also with respect to recorded cases of detached retina.

Structural Anomalies

This term refers to developmental defects or malformations of the eye. Conditions similar in appearance but resulting from surgical or other causes and degenerative structural changes are classified elsewhere. Although the number of cases involved is small, the category is of special interest because it contains several well-recognized hereditary causes of blindness.

The blindness of 403, or 2.0 percent of the recipients, was attributed to these abnormalities. The correction for age increases the proportion to 2.3 percent. The reported numbers of the more frequently occurring anomalies were as follows:

Albinism (lack of pigmentation)	77
Megalophthalmos (abnormally large eyes)	68
Microphthalmos (abnormally small eyes)	61
Anophthalmos (absence of or rudimentary eyes)	20
Coloboma (fissure in part or parts of eye)	17
Aniridia (absence of iris)	8
Other specified anomalies	43
Multiple anomalies	99
Anomalies not specified	10

Although in the scheme of classification this group of causes is placed in the general category of defects involving the eyeball as a whole, in some of these conditions only part of the eye is affected. Thus, in aniridia only the iris is lacking, while coloboma may be a fissure of only a single structure or of several. In albinism the lack of pigment may be confined to the retina, or the iris, choroid, and retina may all lack normal pigmentation. The classification plan did not, however, place in this group all developmental abnormalities affecting a single structure. One of the most common of such anomalies, for example, is congenital cataract, the cases of which, as already stated, were classified with other cases of cataract. Cases of congenital dislocation of the lens were also classified under affections of the lens, although this defect is also a structural anomaly.

It should be noted that some of these defects occur frequently, or even usually, without causing loss of vision to the extent included in the definition of economic blindness. For example, probably relatively few cases of albinism, aniridia, and coloboma result in certifiable blindness. Thus, these figures do not relate to the total frequency of occurrence of the conditions specified, but only to the frequency

with which they appeared as causes of blindness within the recipient group.

The 68 cases reported as megalophthalmos may be chiefly cases of hydrophthalmos or congenital glaucoma. Some other cases of this defect may have been classified with other forms of glaucoma, since commonly this abnormality is not apparent until some time after birth.

The 43 "other specified anomalies" were not otherwise identified in the tables of the State studies. They may embrace a large variety of conditions. Here may be included some cases of retrolental fibroplasia, a condition to which attention has been directed recently by Dr. T. L. Terry, in which an opaque membrane forms behind the lens.[5] This developmental defect, the etiology of which is as yet not established, evidently occurs much more frequently among premature than among full-term infants. Ironically, it appears to be causing a substantial amount of blindness now because it has become possible to save the lives of many very premature infants that formerly would have been lost.

Etiology. — Since the abnormalities included here are defects of development, it is understandable that practically all of them were classified as of prenatal origin. The etiology of three cases was returned as syphilis and that of 14 as unknown, unidentified, or not specified. For only 22 of these cases was hereditary origin regarded as established, while 90 were reported as of presumed hereditary origin.

Sex as a factor. — The reported structural anomalies were found somewhat more prevalent among the women than among the men recipients, the proportions being 2.2 and 1.8 percent, respectively. Among the specified conditions, only cases of albinism were relatively more frequent among the male recipients, and for them the percentage was only slightly higher.

Race as a factor. — A large difference in relative frequency of these conditions was found between white and Negro recipients. For the former the proportion was 2.2 percent as compared with only 1.0 percent for the latter.

Present age. — The adjusted age figures indicate that persons blind as a result of developmental abnormalities have an earlier average mortality than those affected by any other group of conditions included in the classification by type of affection. According to table A–6, two-fifths of all such cases of blindness are under 20 years of age, and the proportions decline markedly with increasing age, only about a fifth of the cases reaching age 50.

The statistics of the schools for the blind, indicate that these structural abnormalities are the causes of approximately one-fifth of the blindness of children and adolescents. This is larger than the proportion for any other type of affection category for this age group.

[5] Reese, Algernon B., M. D., and Payne, Frank, M. D., "Persistence and Hyperplasia of the Primary Vitreous (Tunica Vasculosa Lentis or Retrolental Fibroplasia)," *American Journal of Ophthalmology*, Vol. 29, No. 1 (January 1946), pp. 1–24.

Age at onset. — It is to be expected that a large proportion of the blindness resulting from these defects will occur at an early age. The age at onset of 71.7 percent of the cases was, in fact, reported as under 1 year. Of these cases a large proportion were probably blind at birth. For an additional 12.9 percent the age at onset was given as under 20 years, while for 5.0 percent it was not recorded. Only a little over 10 percent were reported as becoming blind after reaching 20 years of age.

For the more than 2,000 recipients reported to have been blind at birth or to have become so within the first year of life, this category of causes ranked second to cataract, which for this age group as has already been pointed out means congenital cataract, another developmental defect. Together these two categories account for more than a third of the reported cases of blindness occurring before the first birthday.

State differences. — Although the proportions are small for all States, there is considerable variation among the States in the relative numbers of these cases. The percentage for Oklahoma was only 1.0 as compared with 3.3 for South Carolina. In view of the lower ratio of these defects found for Negroes, it is surprising to note that South Carolina has the highest percentage and that three of the other States with more than average proportions of Negro recipients are in the upper half of the following list.

State	*Cases of structural anomalies as percent of all cases*
20 States	2.0
*South Carolina	3.3
Massachusetts	3.2
West Virginia	3.2
South Dakota	3.0
Connecticut	2.7
*New Jersey	2.6
North Dakota	2.6
*Maryland	2.4
Indiana	2.3
*Arkansas	2.3
Kansas	2.2
New Hampshire	2.0
Iowa	1.8
*Louisiana	1.5
Rhode Island	1.5
Wisconsin	1.4
*Tennessee	1.4
Washington	1.3
*Virginia	1.2
Oklahoma	1.0

*State in which more than one-fifth of the recipients were Negroes. See table 6.

Degenerative Changes

Degenerative conditions of many kinds are included in different categories in the classification of causes. This group is intended to be confined to atrophy or other breakdown of the eye as a whole, whether brought about by definite disease or injury, or resulting from the degenerative processes of age. Although panophthalmitis and acute endophthalmitis constitute a separate category of the classification, the end results of these conditions may frequently have been classified under this heading. Almost 4 percent, or 805 recipients, were found to be blind because of such changes. The correction for age reduced the proportion slightly.

Etiology. — Trauma was the recorded etiology for the largest group of these cases (36.9 percent). Infectious diseases, most frequently ophthalmia neonatorum, account for 29.8 percent. For more than a fourth of these cases, however, the etiology was returned as undetermined or was not specified at all.

Sex as a factor. — Degenerative changes of the eyeball were found slightly more often among men recipients (4.1 percent) than among women (3.6 percent). It may be assumed that this is explained by the more frequent occurrence of trauma among men.

Race as a factor. — Classification by race indicates that this cause of blindness is more common for Negro than for white recipients. The respective proportions of total cases were 5.3 percent and 3.6 percent. Again the greater frequency of trauma is a possible explanation, although the greater likelihood of neglect of eye infections among Negroes also deserves consideration.

Present age. — The adjusted distribution of cases by present age shows that these cases are to be found in considerable proportions at all ages. The modal age group is found in the decade 50–59 years. Nearly two-thirds of the cases are in the age classes above 50 years.

Age at onset. — More than a fifth (21.7 percent) of the cases of degenerative change affecting the eyeball as a whole were reported to have become blind before the first birthday. Many of these cases were probably cases of congenital syphilis or of neglected ophthalmia neonatorum. The onset of blindness for substantial, and similar, proportions of these cases occurred in the interval 1–9 years and in the two following decades. The proportions decline steadily after ages 20–29.

State differences. — The wide variation among the States in the proportions f cases of degenerative change can probably be explained in considerable part by differences in classifying cases of general disorganization of the eye resulting from infections. This conclusion is suggested by the following comparison of proportions of cases attributed to degenerative changes and to panophthalmitis and acute endophthalmitis.

State	Percent of all cases	
	Degenerative changes	Panophthalmitis and acute endophthalmitis
Total, 20 States	3.9	1.4
*Maryland	10.7	.3
South Dakota	9.8	.4
Rhode Island	7.6	4.6
North Dakota	7.4	1.7
*South Carolina	7.1	1.5
*Virginia	6.2	3.5
Indiana	5.5	.6
*Tennessee	5.5	1.2
Connecticut	4.8	.5
*Louisiana	4.6	1.5
West Virginia	4.3	.5
Oklahoma	3.5	.5
Iowa	2.9	1.0
*New Jersey	2.9	.6
Kansas	2.4	.6
Wisconsin	2.1	.6
New Hampshire	2.0	.3
Washington	1.8	.3
Massachusetts	.5	1.4
*Arkansas	.2	8.4

*State in which more than one-fifth of recipients were Negroes. See table 6.

Chapter VII.

ETIOLOGIES

Table 12 shows the relative importance in this study of the principal etiological categories of the cause classification. Here, as in table 11 relating to the categories of site and type of affection, the percentage distribution of the total number of cases is given both before and after adjustment for the age deficiency of the sample.

The first two categories listed in this table — unknown to science and undetermined by physician or not specified — contain the large number of cases for which a specific etiology was not assigned. Together they include half of the reported cases, and well over half of the adjusted number of cases. Of the recorded cases in these two categories, approximately three-fifths consisted of eye conditions for which the etiology has not yet been disclosed by science, principally cataract and glaucoma.

Infectious diseases, among which syphilis and trachoma were those most frequently identified by examining physicians, were found responsible for a fourth of the reported cases; in the series of adjusted percentages this proportion fell to a little more than a fifth. The two most frequently reported specific infectious diseases, syphilis and trachoma, as well as ophthalmia neonatorum, which probably usually

Table 12.—*Distribution of recipients of aid to the blind by etiology of eye affection causing blindness*

Etiology	Percentage distribution of all cases	
	Unadjusted for age	Adjusted for age
Total	100.0	100.0
Unknown to science	28.6	34.2
Undetermined by physician or not specified	21.3	20.0
Subtotal	49.9	54.2
Infectious diseases	24.6	21.4
Syphilis	7.7	6.1
Trachoma	7.5	6.8
Ophthalmia neonatorum	2.1	2.0
Septicemia	1.5	1.4
Other specified	3.2	2.7
Not specified	2.6	2.4
Trauma	10.1	8.9
Prenatal origin, not elsewhere classified	9.5	9.4
General diseases, not elsewhere classified	4.8	5.1
Vascular diseases	1.7	2.1
Diabetes	1.5	1.4
Other specified	1.4	1.4
Not specified	.2	.2
Neoplasms	.6	.6
Poisonings	.5	.4

means gonorrheal infection, are considered in detail in the following sections. Septicemia, which ranks fourth among the subcategories of infectious diseases, was reported for only 1.5 percent of the recipients. It should be noted that this category includes infections of the eye tissues through the blood stream arising from local infections elsewhere in the body, such as those of the teeth, tonsils, or sinuses.

Both trauma and prenatal causes other than infections were found responsible for approximately a tenth of the reported cases. Among prenatal causes are the recognized hereditary causes. General diseases other than infections accounted for about 5 percent of all cases. Very small proportions of the total group of cases were attributed to the other two main etiological categories, neoplasms and poisonings.

Unknown to Science

Since the underlying causes of many eye defects are still obscure, a larger proportion of cases is included under the heading "unknown to science" than in any other single category among the etiologies, namely 28.6 percent. Correction for age distribution increases this proportion to 34.2 percent, or more than a third of all cases. The difference is accounted for chiefly by the very frequent occurrence of cataract (other than congenital cataract) and glaucoma, for which a specific etiology was rarely recorded and which represent, respectively, 48.3 and 35.1 percent of all cases included in this category. The group is affected to much less extent by refractive errors (8.1 percent), chiefly myopia, of which the etiology is also obscure. These three types of defect together account for more than nine-tenths of all cases of which the etiology was tabulated as unknown to science.

Because both cataract and glaucoma are conditions which more often occur in late middle life or old age than earlier, the cases classified as unknown to science fall chiefly in the older age groups:

Age	*Percentage distribution of cases of etiology unknown to science (Adjusted for age)*
Total	100.0
Under 20 years	.3
20–29 years	.7
30–39 years	1.8
40–49 years	4.2
50–59 years	10.1
60–69 years	20.7
70–79 years	33.0
80 years and over	29.1
Unknown	.1

In the adjusted-age distribution, almost 93 percent of all the cases unknown to science are 50 years of age or over; nearly 83 percent are 60 years or over.

The interstate differences in the proportion of cases of unknown etiology are affected greatly by the relative frequencies especially of cataract and also of glaucoma cases, which in turn are largely influenced by the proportions of elders in the respective recipient State groups. The six States reporting etiology unknown to science for a third or more of their recipients are among the seven States with largest proportions of recipients aged 65 years or over. South Dakota and Rhode Island with very few elders among their aid to the blind recipients have the lowest proportions of cases for which etiology unknown to science was reported. Connecticut is a notable exception in this respect, having a much higher proportion of unknown-to-science cases than would be expected from its small number of older recipients.

State	*Cases of etiology unknown to science as percent of all cases*
20 States	28.6
*North Dakota	44.2
*Kansas	40.3
*Washington	37.3
*New Hampshire	36.7
*Wisconsin	35.7
*Virginia	33.2
Maryland	31.8
Massachusetts	29.6
New Jersey	29.1
*Arkansas	27.6
Connecticut	27.5
*Indiana	26.9
Louisiana	26.5
*Iowa	25.8
Oklahoma	24.5
South Carolina	20.5
West Virginia	19.4
Tennessee	17.7
South Dakota	17.0
Rhode Island	16.7

*State in which more than one-third of the recipients were 65 years of age or over. See table 7.

Undetermined by Physician or Not Specified

Cases for which the etiology was recorded by the examiner as "not determined" and those for which this line on the medical record was left blank have been treated together because they probably have the same significance. According to his habit in recording, an examining physician who finds insufficient evidence for determining the etiology of an eye condition may either state this fact or make no entry whatever. The number of such cases was 4,392, or more than a fifth of the total recipient group.

Failure to record a complete diagnosis is, of course, not necessarily a reflection on the quality of the examination. Unfortunately, in many instances a wholly satisfactory examination is impossible. For example, the media of the eye may no longer be transparent, or essential history or other data needed to distinguish between several possible etiologies may be lacking. However, if the evidence does not permit assignment of an etiology, an adequate examination record should indicate this result, leaving no doubt that the specification of etiology was not merely overlooked by the examiner.

The State agencies differ in their insistence on such entries when the diagnosis cannot be completed. But in view of the care taken in each of the States in preparing the data for this study, it can probably by assumed that in very few cases was the record of etiology omitted carelessly. As the following figures show, four States — Arkansas, North Dakota, Kansas, and Louisiana — reported no cases for which no entry at all was made for etiology, while most of the other States had relatively few. Three-tenths of Virginia's cases, however, were reported in this category, but this State returned very few cases as etiology undetermined by physician.

Cases of etiology undetermined by physician and not specified as percent of all cases

State	Both categories	Undetermined by physician	Not specified
Total, 20 States	21.3	15.8	5.5
*Tennessee	39.4	27.2	12.2
*New Jersey	33.8	28.4	5.4
*Virginia	33.6	4.1	29.5
*South Carolina	32.0	17.3	14.7
Washington	30.9	25.5	5.4
Oklahoma	27.4	26.8	.6
Wisconsin	26.0	18.3	7.7
*Maryland	24.4	20.0	4.4
Iowa	23.3	14.7	8.6
Rhode Island	18.1	16.6	1.5
*Louisiana	17.5	17.5	.....
New Hampshire	16.8	16.5	.3
West Virginia	13.8	7.1	6.7
Connecticut	12.2	10.6	1.6
North Dakota	12.1	12.1	.....
South Dakota	11.3	9.0	2.3
Kansas	10.1	10.1	.....
Massachusetts	9.8	6.6	3.2
Indiana	8.4	8.3	.1
*Arkansas	6.6	6.6	.....

*State in which more than one-fifth of the recipients were Negroes. See table 6.

For more than a fifth (21.3 percent) of the total group of recipients, information concerning the underlying cause of blindness was found inadequate or for other reason was not recorded by the examiner. The proportions of such cases varied among the States from only 6.6 percent in Arkansas to 39.4 percent in adjoining Tennessee. The reasons for the wide variation cannot be assigned definitely, but it is probable that the differences were largely due to differences in practice concerning assignment of etiologies when the nature of the lesion and the available medical history leave much room for doubt.

In this connection it is of interest to note that for 1,270, or much more than a fourth of the cases of unassigned etiology, the eye condition was diagnosed as optic nerve atrophy (table A–8).

The cases of etiology undetermined or not specified were relatively considerably less frequent among white recipients (19.9 percent) than among Negroes (26.8 percent). This is related to the fact that four of the States with high proportions of Negro recipients had the four highest proportions of cases of unassigned etiology. Arkansas, however, with a large proportion of Negro recipients, returned few cases of etiology undetermined by the physician and none at all for which no entry was made concerning etiology.

Greater appreciation of the need for full recording of history and the findings of the eye examinations of aid to the blind applicants on the part of many physicians making these examinations, and recognition of the essential purpose of the eye report should, in the future, materially reduce the number of incompletely diagnosed cases. State agencies can help to reduce this group by obtaining and submitting to the examining physicians more pertinent information concerning applicants referred for eye examination than is now usually supplied. Not infrequently, this effort could result in constructive service either to the applicant or to members of his family.

Infectious Diseases

Blindness with a background of infectious disease constitutes the largest group of specified etiologies. Included here are 5,059, or 24.6 percent, of the recipients studied. The three most common etiologies within this major group are syphilis, trachoma, and, much less frequently, ophthalmia neonatorum. Each of them will be discussed in some detail because of their continuing importance as public health problems.

Exceeding the number of ophthalmia neonatorum cases are those of unspecified infectious diseases. The blindness of 2.6 percent of all recipients was attributed to an infectious disease that was not identified. Such cases constitute about 11 percent of all those attributed to infectious diseases.

Site and type of affection. — Almost half (47.4 percent) of the blindness assigned to infectious disease involved primarily the cornea; ulcerative keratitis, ulceration and vascularization, and pannus were the most frequent types of affection. The optic nerve was reported as the part affected in another fourth (24.9 percent) of the cases. The iris and ciliary body, choroid and retina, and the eyeball in general were involved with about equal frequency. Only rarely is the lens affected by infectious disease. Forty-eight cases of cataract, however, were reported as resulting from infections.

Race as a factor. — The data of table A–10 suggest that infectious disease is somewhat more common as a cause of visual loss among Negroes than among white persons. As compared with 24.0 percent of the white recipients, 27.0 percent of the Negro recipients were reported as without useful vision because of an infectious disease. The difference in ages of the groups, however, affects this comparison materially. If the comparison were limited to ages under 60, this difference would be much reduced and might disappear.

The most clearly significant differences found between Negro and white recipients with respect to blindness from infectious disease relate to the two specific diseases, syphilis and trachoma. Syphilis was reported relatively much more frequently for Negroes, while trachoma, a common etiology for white persons, was assigned as a cause of Negro blindness in only 13 instances.

The proportions of blindness attributed to gonorrhea, septicemia, and smallpox were somewhat higher for Negroes, while those for measles, meningitis, and scarlet fever were higher for white recipients, but the nature of the data do not permit placing large reliance on these differences. The kind of infectious disease was not specified relatively twice as frequently for white as for Negro recipients.

Present age. — The adjusted-age figures (table A–11) indicate that infectious diseases were the cause of the blindness of about a fourth of the blind persons who are now under 30 years of age; of somewhat less than a third of those from 30 to 60; and of diminishing proportions of older blind persons — 23 percent of those from 60 to 69; 15 percent of those from 70 to 79; and as little as 8 percent of those who have reached 80 years.

Age at onset. — With respect to age of occurrence, table A–12 shows that, of the 2,118 recipients who were reported as having become blind before they were a year old, infectious disease was the assigned etiology of 26 percent. The proportion for infectious disease increases to 40 percent for those who became blind between 1 and 10 years of age; it is about 30 percent for recipients whose blindness occurred between 10 and 50 years, and the percentages diminish as the age at onset increases beyond 50 years.

State differences. — State differences are extreme in the relative amount of blindness attributed to infectious diseases. They are responsible for almost half (47.2 percent) of all cases of recipients in South Dakota and almost two-fifths of those in Arkansas and Indiana. In each of these States, trachoma is the most frequent specific etiology. At the other extreme, infectious disease was reported as the etiology of little more than a tenth of the cases in Washington.

State	Cases of infectious diseases as percent of all cases
20 States	24.6
South Dakota	47.2
Arkansas	39.2
Indiana	37.5
Massachusetts	32.0
West Virginia	31.1
*Oklahoma	30.9
Louisiana	29.7
Rhode Island	27.3
Kansas	24.3
Connecticut	23.3
*Maryland	22.2
*South Carolina	20.1
*Iowa	18.8
*Tennessee	18.7
*New Jersey	15.6
New Hampshire	15.2
*Virginia	14.8
North Dakota	14.7
*Wisconsin	11.1
*Washington	10.5

*State in which the etiology of more than a fifth of the cases was reported as undetermined by physician or not specified. See page 71.

The position of the States in this list is much influenced by the two major diseases — syphilis and trachoma. Six of the 8 States reporting higher-than-average proportions of syphilis and trachoma combined are among the 8 States having more than the average proportion of blindness from all infectious diseases. Of the 10 States comprising the lower half of this list, 8 are States with more than the average proportion of cases of etiology undetermined by physician or not specified.

Syphilis

It can be stated with assurance that syphilis resulted in more loss of vision among these recipients than any other infectious disease, and it may even be the largest single cause of their blindness.

Syphilis was the recorded etiology for 1,589 cases, or only 7.7 percent of the total number. Even this is a large proportion when judged by the results of some other studies. Analysis of the reported data, however, as well as comments of representatives of some of the State agencies, indicates that for large numbers of cases in which syphilis was the probable cause this etiology was not recorded, usually because the diagnosis could not be made with certainty. The reluctance of some examiners to make the diagnosis of syphilis part of an applicant's record, even though the evidence is clear, probably also contributes to understatement of this etiology. However, since most of the numerous eye conditions which

can be caused by syphilis can result also from other causes, assignment of a specific etiology for these conditions is often very difficult, especially when the condition has existed for a long time and when both adequate medical history and evidence from laboratory tests are lacking, as they are frequently when the eye examinations of applicants for aid to the blind are made.

Because of the apparent underreporting of syphilis in this study, and because the same factors are likely to result in understatement of this cause in other similar studies, attempt has been made to estimate the full extent to which syphilis may have caused blindness among these recipients. By attributing to syphilis different proportions of the cases for which the tabulated etiology was "infectious disease, not specified," "undetermined by physician," or "not specified," and for which the type of affection was one frequently caused by syphilis, estimates varying from 13.5 percent to 20 percent of the total number of cases were obtained.[1] The lowest of these estimates is probably considerably too low, while the highest is by no means impossible. It appears conservative to conclude that more than half of the cases of luetic blindness were not so reported and that the true proportion of these cases is more than 15 percent.

Site and type of affection. — Syphilis may affect any part of the ocular structure, but its lesions occur in some parts much more frequently than in others. The optic nerve is recognized as the most common primary site of affection from this cause. It was the recorded site for more than three-fifths of the specified syphilitic cases, the type of affection in almost all these cases being optic nerve atrophy. Affections of the choroid or retina, most frequently chorioretinitis, and those of the cornea, chiefly interstitial keratitis, comprise about the same proportions of the recorded syphilis cases (12.8 and 12.2 percent), while affections of the iris and ciliary body were somewhat less numerous (9.0 percent).

Race as a factor. — Syphilis is undoubtedly a major cause of blindness among Negroes. It was the assigned etiology relatively more than three times as frequently for them as for the white recipients in this study — 18.1 percent in contrast to only 5.1 percent. There is at least the possibility that this difference may be partly due to less caution in arriving at this diagnosis for persons of one race than for those of the other. The prevalence of syphilis, however, has been and continues to be generally so much higher among Negroes that the variance shown is not surprising.

Examination of both the etiology and the type-of-affection data for the two races in tables A-10 and A-5 indicates that, while there was much underreporting of syphilis for both races, the extent of underreporting may have been less for Negroes.

[1] An estimate of 13.5 percent was obtained by attributing to syphilis part of the cases of indefinite tiology of only the seven type-of-affection categories which contain most of the reported syphilis cases — assuming for each of these types of affection that syphilis cases comprised the same proportion of cases of indefinite etiology as of cases for which a definite etiology was assigned. This estimate is probably extremely conservative. The seven type-of-affection categories with largest proportions of cases for which syphilis was the reported etiology may be found readily from table A-8.

Present age. — The adjusted distribution of recipients by present age and by etiology (table A–11) shows that reported syphilis cases comprised the largest proportion of all cases in the age group 40 – 49 years (12.9 percent) but that their relative importance was nearly as large in the 10-year age groups on either side. The adjusted data indicate that, in a representative sample of blind persons distributed by present age, the modal group of cases of syphilitic blindness would be that from 50 to 59 years. Mortality reduces the frequencies progressively in the older age classes.

Age at onset. — With respect to incidence of blindness, table A–12 indicates that syphilis is of greatest relative importance in the decade 30–39 years. Of the cases occurring at that age, syphilis accounted for 15.1 percent, as compared with 13.2 percent for ages 40–49, and 10.8 percent for ages 20–29. Both below and above these ages, the proportions due to syphilis taper off. These data make it clear that blindness as a result of syphilis occurs chiefly during the most productive period of life.

State differences. — The proportions of specified syphilis cases varied among the 20 States from only 1.3 percent in North Dakota to 14.9 percent in Louisiana and 15 percent in Maryland. Obviously, various factors affect these proportions. Probably one of the important factors is the difference in practice concerning assignment of this etiology when there is room for doubt. Six of the seven States with more than the average proportion of Negro recipients have more than

State	*Cases of specified syphilis as percent of all cases*
20 States	7.7
*Maryland	15.0
*Louisiana	14.9
Rhode Island	13.6
Connecticut	12.7
West Virginia	12.6
*New Jersey	11.5
*Arkansas	11.0
Massachusetts	10.9
*South Carolina	10.8
Indiana	8.9
*Virginia	8.0
Kansas	7.4
*Tennessee	6.2
Iowa	5.4
Washington	4.5
New Hampshire	4.4
South Dakota	3.8
Oklahoma	3.0
Wisconsin	2.3
North Dakota	1.3

*State in which more than one-fifth of the recipients were Negroes. See table 6.

the average proportion of reported syphilis cases. The seventh of these States is Tennessee, which has the highest proportion of cases with etiology undetermined by physician or not specified at all.

Trachoma

This disease, which in the United States is now generally under effective control, was reported as the cause of blindness in this study almost as often as syphilis. It was the assigned etiology for 1,551, or 7.5 percent of the cases.

Although its prevalence in this country has long been far less than that in many parts of the world, trachoma is still common among American Indians and continues to be found with some frequency among the white rural population of the so-called trachoma belt. This centrally located endemic region for trachoma extends westward from West Virginia and embraces large portions of that State, Kentucky, Tennessee, Missouri, Arkansas, and Oklahoma, and smaller parts of Ohio, Indiana, Illinois, and Kansas. Since 6 of these 10 States are included in this study, the proportion of trachoma cases found for the recipients of the 20 participating States is somewhat too high to be representative of the United States as a whole. It is certain, however, that this disease was responsible for the blindness of a large number of persons now blind in the United States, and that it is still an important potential cause of new blindness in a substantial number of States.

Site and type of affection. — Beginning as a persistent conjunctivitis, trachoma leads to blindness usually only after long neglect of the infection. Loss of vision typically results from ulceration and scarring of the cornea, which is frequently accompanied by the formation of a pannus preventing the entrance of light through the pupil. The cornea is almost invariably the site of the condition that causes blindness. It was so reported for 96.7 percent of these cases.

Race as a factor. — Because the data on Indians are combined with those on white recipients in table A–10, it is not possible to state definitely the proportions of trachoma blindness for the recipients of these two races separately. The proportion shown for white recipients in the table is 9.4 percent. Because of the certainly very high proportion of such cases among the 326 Indian recipients, their inclusion probably affects the figure for this disease much more than that for any other etiology. Their numbers are too few, however, to influence the proportion for even this disease very greatly. Indians were reported among the recipients of only eight of the States, and if all their blindness had resulted from trachoma they could account for only slightly more than a third of the trachoma cases in those States. Making this much-too-large assumption, the proportion of trachoma cases for white recipients alone would be at least 7.5 percent.

In contrast to the high proportion for white recipients and the certainly much higher proportion for Indians, the percentage of trachoma

cases among the more than 4,000 Negro recipients was extremely small — only 0.3 percent.[2] This finding confirms what has been observed by ophthalmologists, that, although no race is immune, this disease is rare among Negroes.

Present age. — Most of the recipients blind as a result of trachoma were older persons. The adjusted-age tabulations (table A–11) indicate that in our present blind population trachoma cases will be found in all age groups, but in largest proportion — about 9 percent of all cases of these ages — in the age groups 50–59 and 60–69 years. This table indicates also that of all persons now blind because of trachoma, three-fifths are over 60 years of age and four-fifths are over 50 years.

Age at onset. — Table A–12 shows that loss of sight from trachoma occurred at all ages, but that relative to other causes it was most important among cases occurring between 1 and 30 years of age. A fourth of the recipients blind from this cause became blind before they were 20 years of age and well over half before reaching 40 years.

State differences. — The participating States vary more with respect to the relative importance of this etiology than any other, location of the State in relation to the trachoma region and racial composition being the most important explanatory factors. South Dakota, more than two-fifths of whose recipients were Indians, leads with

State	*Cases of trachoma as percent of all cases*
20 States	7.5
South Dakota	35.1
*Oklahoma	23.3
*Arkansas	15.9
*Indiana	11.4
North Dakota	9.1
*West Virginia	8.7
*Kansas	8.6
Iowa	6.3
*Tennessee	5.4
Washington	3.7
Wisconsin	1.7
Massachusetts	1.2
Virginia	1.2
Louisiana	1.1
New Jersey	.5
Maryland	.5
Connecticut	.5
New Hampshire	.3
Rhode Island	
South Carolina	

*A trachoma-belt State.

[2] For Oklahoma, which is in the trachoma belt and has a large number of recipients, separate percentages are available for the three races. Among its 109 Indian recipients, 51 or 46.8 percent were trachoma cases; among 1,723 white recipients, 442 or 25.7 percent were trachoma cases; and among 308 Negroes, only 6 or 1.9 percent were trachoma cases.

trachoma cases comprising 35.1 percent of all cases. At the other extreme, both Rhode Island and South Carolina reported no case with this etiology.

The proportion of identified trachoma cases for Tennessee is much smaller than might be expected from the long history of trachoma in this State. That the frequency of such cases among Tennessee's recipients may actually be much larger than indicated by the recorded percentage is suggested by the two facts that in the classification of types of affection its proportion of corneal conditions is high, while its proportion of cases of undetermined and not-specified etiology is higher than that of any other State.

Ophthalmia Neonatorum

Although only 429, or 2.1 percent, of the recipients studied were reported as being blind as a result of ophthalmia neonatorum, this etiology was third among specified infectious diseases. For just over half of these cases the infection was specified as gonorrhea. For the other half, with only one exception, the kind of infection was not specified, but it may probably be assumed that it was gonorrhea in a very large proportion of them. For only 74 cases other than ophthalmia neonatorum was gonorrhea reported as a cause of recipient blindness.

Despite the great progress in its prevention during the past 30 years or more, ophthalmia neonatorum is still a not uncommon cause of blindness among children in schools for the blind.[3] The latest compilation of cause-of-blindness statistics for schools for the blind attributes to this etiology the cases of 445 school pupils, or 10.4 percent of the total number enumerated. Its importance in the present study is overshadowed by causes more prevalent among adults, especially the aged. The relatively small number of these cases reported for a group many of whom were born in a period when prophylaxis was in limited use suggests that some cases belonging here may appear in other categories. It is possible that a considerable number for which the medical history was inadequate may have been included under "prenatal origin, not elsewhere classified."

Site and type of affection. — As would be expected, corneal affections, chiefly ulcerative, were reported in the majority of these cases (66.7 percent). For about three-tenths, however, the eyeball as a whole was the reported site, degeneration of the bulb being indicated in most of these instances.

Race as a factor. — The study does not give evidence of significant difference between white and Negro recipients in the prevalence of blindness from this cause. The proportions found are 2.1 and 2.0 percent, respectively.

Present age. — The adjusted figures of table A–11 indicate that the modal age of persons now blind because of ophthalmia neonatorum is

[3] Kerby, C. Edith, "Eye Conditions Among Pupils in Schools for the Blind in the United States, 1942–1943," *Outlook for the Blind, and the Teachers Forum*, December 1945, Supplement.

30–39 years. While a higher proportion of the total number is shown for the age group under 20, the reader is reminded that that age class includes two decades.

Age at onset. — Since any gonorrheal eye infection may be highly destructive, most of the blindness resulting from ophthalmia neonatorum would be expected to have its onset at a very early age. For 85.5 percent of these cases, loss of sight was reported as occurring before the first birthday.

State differences. — Rhode Island, with only 66 recipients, reported 5 cases, or 7.6 percent of all its cases, due to ophthalmia neonatorum. For Massachusetts and West Virginia, both with much larger numbers of recipients, the proportion of recipient blindness attributed to this cause was 4.3 percent. Washington reported an extremely small proportion — 0.4 percent.

State	*Cases of ophthalmia neonatorum as percent of all cases*
20 States	2.1
Rhode Island	7.6
Massachusetts	4.3
West Virginia	4.3
South Carolina	3.6
Maryland	3.3
New Hampshire	3.0
Louisiana	2.8
Indiana	2.4
Iowa	2.2
Oklahoma	1.9
South Dakota	1.9
Tennessee	1.8
Arkansas	1.7
Kansas	1.3
New Jersey	1.1
Connecticut	1.1
Wisconsin	1.0
North Dakota	.9
Virginia	.7
Washington	.4

Other Infectious Diseases

To specified diseases other than syphilis, trachoma, and ophthalmia neonatorum was credited the blindness of 959 recipients, or nearly a fifth of all reported infectious disease cases. This group is made up of relatively small numbers of cases resulting from such familiar diseases as diphtheria, gonorrhea other than of the newborn, measles, meningitis, scarlet fever, septicemia, smallpox, tuberculosis, and typhoid fever. Among these cases the largest number, 299, was attributed to septicemia, for which the proportion of all cases was 1.5 percent. More than

100 cases were reported for only two other of these diseases, meningitis, 132, and measles, 111. Only 36 cases were reported for smallpox and only 2 for diphtheria.

The remarkable advances during recent decades in the prevention and control of many communicable diseases, including those of childhood, has rendered them progressively less a threat to eyesight. For example, the progress that has been made toward the eradication of diphtheria and the effective control of smallpox, typhoid fever, and even of measles and scarlet fever, has reduced to extremely small proportions the number of new cases of blindness likely to occur from these sources.

Evidence of that progress is found in the mortality statistics for the death registration area of the United States.[4] For both diphtheria and typhoid fever the death rates were lower in 1943 than in 1900 by 98 percent, while for scarlet fever the difference was 97 percent. The corresponding decline for respiratory tuberculosis was 78 percent, and for other tuberculosis, 83 percent.

Trauma

Injuries occurring under a great variety of circumstances left 2,079, or 10.1 percent, of the recipients without useful sight. Included here, but of relatively infrequent occurrence, are injuries to the eye during birth or in the course of medical treatment or surgery. Chemical burns and injuries from heat or light are also grouped with the far more common perforating wounds and contusions. Damage resulting from intake of or exposure to poisons, however, is not included here.

The plan for reporting the cause data called for distinction between occupational and nonoccupational injuries resulting in blindness. As may be seen from table A–1, this differentiation was not recorded for about three-tenths of the trauma cases. For nearly two-thirds of the remaining cases, nonoccupational activity was specified. Injury resulting from play was reported for more than a fourth of the specified cases. Seventy-six cases were ascribed to medical or surgical procedures, and 18 to injury at birth.

Site and type of affection. — Any part of the ocular structure may be affected by trauma. In this study the reported site of affection for three-tenths of the trauma cases was the iris and ciliary body, and sympathetic ophthalmitis was the type of affection in most of these cases. Involvement of the eyeball generally was reported nearly as frequently, while corneal affections were recorded for a sixth of the trauma cases. Traumatic blindness was attributed less frequently to injuries to the lens, to the optic nerve, and to the choroid and retina.

Race as a factor. — The figures of table A–10 indicate about the same proportion of traumatic blindness among Negro and white recipients, the percentages being 10.7 and 10.0. A substantially higher propor-

[4] U. S. Department of Commerce, Bureau of the Census, *Vital Statistics of the United States, 1943*, pt. I, p. 14.

tion might be expected for the Negro recipients, partly because of their considerably lower average age. If the disproportionate numbers of syphilis cases are excluded, the proportion of trauma cases for Negroes becomes larger by one-fourth than that for white recipients.

Age at onset. — The age of occurrence of blindness due to trauma is of special interest because of its implications for programs of prevention. The data on age at onset indicate that well over a fourth of the recipients blind because of trauma became blind before reaching 20 years of age; nearly a fifth when they were from 20 to 29 years of age, and a not much smaller proportion in the next higher decade. Thus nearly two-thirds of these recipients were reported to have become blind before they were 40 years of age.

Relative to other cases, trauma is of greatest importance in the early years of life. It was the etiology recorded for more than a fifth of the cases with onset at 10–19 years and also 20–29 years, and for a seventh of the cases with onset at ages 1–9 and 30–39.

State differences. — West Virginia reported relatively much more traumatic blindness than any other State. Its proportion of such cases, 18.0 percent, is about three and one-half times that of Massachusetts, which is the lowest of the 20 States. The fact that West Virginia's principal industry is coal mining may help to explain its large number of traumatic cases. The sex composition of the recipient groups of West Virginia and Arkansas is consistent with their high proportion of trauma cases. Both States had higher proportions of male recipients than any of the other States.

State	*Cases of trauma as percent of all cases*
20 States	10.1
West Virginia	18.0
Arkansas	14.8
South Carolina	13.8
Iowa	13.2
New Hampshire	12.5
South Dakota	12.1
Tennessee	11.9
North Dakota	11.3
Louisiana	10.7
Virginia	10.7
Connecticut	10.6
Wisconsin	9.6
Rhode Island	9.1
Kansas	8.8
Washington	8.4
Oklahoma	8.1
Maryland	8.0
New Jersey	7.5
Indiana	7.2
Massachusetts	5.2

Poisonings

Injury to the ocular structure through consumption or absorption of chemical poisons not infrequently results in loss of sight. Wood alcohol, lead, naphthalene, and dinitrophenol (a constituent of some reducing drugs) are only a few of many such poisonous substances which, reaching the eye through the blood stream, may be responsible for serious impairment of vision, if not complete blindness. Among the recipients of aid to the blind, poisonings of this sort were found to be of minor importance, being assigned as the cause of blindness of only 101, or 0.5 percent, of those studied. It should be noted that chemical burns, or injuries resulting from direct contact of a chemical with the surface of the eye, are classified not in this etiological group but with trauma.

Site and type of affection. — Although different parts of the eye may be affected by different poisons, the nerve tissues are those most likely to be damaged by toxic substances. Of the instances of poisonings reported in the study, two-thirds were recorded as cases of optic nerve atrophy, and altogether eight-tenths as affections of the optic nerve.

The cornea was reported as the site of affection in eight cases. It seems probable, however, that they were instances of direct chemical injury and mistakenly classified here. The two cases of sympathetic ophthalmitis for which the etiology was given as poisoning also appear to be incorrectly classified.

It will be seen that only two cases of cataract were attributed to this etiology. Since certain poisons typically produce cataract, a larger number would not have been surprising.

Race as a factor. — Substantially the same proportion of cases of blindness due to poisonings was found for white and Negro recipients. The proportions were, respectively, 0.5 and 0.4 percent.

Age at onset. — All periods of active adult life appear to be equally liable to occurrence of blindness from this cause. Distributed by age at onset of blindness, the proportions of cases are small for the first two decades of life, but are much larger and of similar size for the next four decades, or from 20 through 59 years.

State differences. — The proportion of cases attributed to poisonings was highest for Rhode Island (1.5 percent), but all four of the participating New England States are at or close to the top of the following list. West Virginia, which reported the largest proportion of trauma cases, ranks high also with respect to cases resulting from poisons.

State	Cases of poisonings as percent of all cases
20 States	0.5
Rhode Island	1.5
New Hampshire	1.3
Massachusetts	1.1
West Virginia	1.1
Connecticut	1.0
Kansas	.7
Washington	.7
Indiana	.6
Tennessee	.5
Arkansas	.5
New Jersey	.4
South Dakota	.4
North Dakota	.4
Wisconsin	.3
Iowa	.3
Louisiana	.3
Maryland	.3
Virginia	.2
Oklahoma	.1
South Carolina	.1

Neoplasms

Loss of vision owing to cancer or other tumors was reported for 135, or 0.6 percent, of the total group of recipients. This proportion, however, does not at all adequately represent the relative importance of this cause, inasmuch as early mortality is much more characteristic of new growths than of most other causes of blindness. A materially higher proportion of cases resulting from neoplasms is found among younger blind persons. The statistics of schools and special classes for blind children reveal about five times as large a proportion for this etiology as that found here for recipients of aid to the blind. Even these data are affected by the high rate of mortality from neoplasms, a leading cause of death among blind children.[5]

Site and type of affection. — The responsible eye condition was reported as optic nerve atrophy in about half the cases diagnosed as resulting from neoplasms. To this and other affections of the optic nerve or visual centers of the brain were attributed approximately two-thirds of these cases. It is surprising to find as many as 29 cases, or more than a fifth of all those diagnosed as resulting from this etiology, recorded as neoplasms of the cornea.

[5] "Mortality of the Blind," *Statistical Bulletin, Metropolitan Life Insurance Company*, Vol. 16, No. 9 (September 1935), pp. 1–3.

Present age. — The adjusted figures suggest a tendency for cases resulting from neoplasms to be distributed by present age rather evenly over the first seven decades of life, or through age 69.

Age at onset. — The data for age at onset show relatively large proportions of blindness from neoplasms in the five decades from 10 through 59 years. As already indicated, however, these figures relate only to the survivors of a cause from which early mortality is more common than from most causes of blindness.

State differences. — Rhode Island, with its small number of recipients, again leads the States with respect to the proportion of cases of blindness from new growths. Its 3.0 percent, however, represents only two such cases. Kansas, Maryland and Massachusetts, each with substantial numbers of cases, classified from 1.1 to 1.5 percent of their recipients in this category. At the other extreme, South Carolina reported no cases of this kind.

State	*Cases of neoplasms as percent of all cases*
20 States	0.6
Rhode Island	3.0
Massachusetts	1.5
Maryland	1.2
Kansas	1.1
Connecticut	1.0
Oklahoma	.9
Iowa	.9
Wisconsin	.8
Tennessee	.6
Louisiana	.6
Indiana	.4
West Virginia	.4
South Dakota	.4
North Dakota	.4
Virginia	.3
New Jersey	.3
New Hampshire	.3
Washington	.2
Arkansas	.1
South Carolina	

General Diseases, Not Elsewhere Classified

What are here termed general diseases constitute a group of disorders affecting the body as a whole, or a major system, in which deterioration of ocular tissue, with resulting loss of vision, is a possible complication. Excluded here, however, are all general infectious disorders, such as secondary and tertiary syphilis, tuberculosis, and septicemia.

Most of the general diseases are degenerative conditions. They include such familiar diseases as anemia, arteriosclerosis, diabetes, and certain types of nephritis. Also included here are toxemia of pregnancy

and some diseases of the central nervous system. Although some of these conditions occur with considerable frequency as causes of blindness, they are not among the more commonly occurring causes.

It should be recognized that the diagnosis of these general affections as etiologies of blindness cannot always be made with great certainty. For although the given systemic condition may sometimes be the actual cause of the eye defect, in other instances it may occur concurrently with an independently derived ocular lesion. The uncertainty of the diagnosis appears to be especially likely in the case of cataract of older persons. There is general agreement among ophthalmologists that cataract can be caused by diabetes. But some authorities believe that the only true diabetic cataract is a rapidly maturing form occurring only in young subjects and that a causal relationship is lacking in the much more frequently diagnosed cases of cataract of older diabetic persons.[6] Other authorities, however, hold that cataract of older as well as of younger persons can be caused by diabetes, although it is not necessarily the cause in all cases in which both conditions are present.

Together the general diseases classified here were reported as the underlying cause of blindness of 994 of the recipients studied, or 4.8 percent of the total number. Table A–1 gives the following subdivision of these cases:

Vascular diseases	345
Diabetes	303
Diseases of the central nervous system	122
Nephritis and other kidney diseases	65
Diseases of pregnancy and childbirth	20
Nutritional deficiency	12
Anemia and other blood diseases	8
Other specified general diseases	75
General diseases not specified	44

The first two groups are considered in the two following sections.

Vascular Diseases

In vascular diseases, such as arteriosclerosis and vascular hypertension, which are commonly associated, changes occur in the walls of the blood vessels that interfere with their normal function. Among results, which may occur in various parts of the body, may be abnormal exudations from the vessels, hemorrhages, or thromboses. The delicate tissues of the eye are susceptible to gradually developing damage from these causes.

This etiology was reported for only a small number of the recipients, 345, or 1.7 percent of the total number.

Site and type of affection. — Between half and two-thirds of these cases were diagnosed as affections of the choroid and retina, and each type-of-affection category within this group of conditions was represented by at least one case. The most frequent single type of affection

[6] "Medical Ophthalmology," *The Eye and Its Diseases*, edited by Conrad Berens, M. D., 1938, p. 815.

reported as resulting from these diseases, however, was optic nerve atrophy, which if actually the result of a vascular disease was probably not the primary eye condition which resulted in loss of vision. A few instances of various other eye conditions were attributed to vascular diseases, including eight cases of cataract. In seven instances ocular hypertension, or glaucoma, was reported as the type of affection induced by vascular disease.

Race as a factor. — This etiology was reported relatively somewhat more frequently for white than for Negro recipients.

Present age. — That diseases of the vascular system are associated with age is reflected by the adjusted figures of table A–11. They show a larger proportion of old persons for this than for any other etiological category. Nearly a third of the adjusted number of cases are 80 years of age or over; exactly two-thirds at least 70 years; and only 12 percent less than 60 years.

Age at onset. — The most frequent age at onset for the recipients whose loss of sight was attributed to vascular diseases was from 60 to 69 years, but the proportions of cases with onset in each of the two preceding decades, and also the one following, was substantial. The median age at onset was higher for this etiology than for any other.

State differences. — While Massachusetts and Connecticut reported the blindness of more than 3.0 percent of their recipients as due to

State	*Cases of vascular diseases as percent of all cases*
20 States	1.7
Massachusetts	3.4
*Arkansas	3.3
Connecticut	3.2
*Kansas	3.0
*Indiana	2.1
*Wisconsin	2.0
*New Hampshire	2.0
*Washington	1.8
New Jersey	1.6
*Iowa	1.5
Maryland	1.5
*North Dakota	1.3
Louisiana	1.0
Tennessee	.9
*Virginia	.9
West Virginia	.7
South Dakota	.7
Oklahoma	.6
South Carolina	.5
Rhode Island	

*State in which more than one-third of the recipients were 65 years of age or over.

See table 7.

vascular diseases, in the neighboring State, Rhode Island, no case resulting from this cause was found. Arkansas attributed a relatively high proportion of cases to this etiology, as also did Kansas. The Southern States generally reported relatively few such cases. It is clear that the age distribution of the recipient groups is an important factor affecting the frequency of these cases.

Diabetes

Diabetes is another degenerative disease occurring more often after middle age than earlier. It was found in this study to be a slightly less frequent cause of blindness than diseases of the vascular system. The loss of vision of 303, or 1.5 percent, of the recipients studied was attributed to this cause.

Site and type of affection. — The types of defect most frequently diagnosed as resulting from diabetes were cataract and retinitis. Almost the same numbers of cases were reported for these conditions, each accounting for just over a third of all diabetic cases. If the closely related affections, chorioretinitis and retinal hemorrhage, are combined with retinitis, retinal lesions are found to comprise well over half of these cases, which is consistent with the statement frequently made that the retina is the most common site of diabetic lesions affecting vision.

That there is a causal relationship between diabetes and blindness is suggested by evidence of a much higher than normal death rate from this disease among blind persons. The study, already mentioned, of death rates of nearly 12,000 policyholders of the Metropolitan Life Insurance Company who became blind after their policies had been issued, and whose blindness was attested by the fact that a disability allowance was granted for that reason, revealed for them a mortality rate from diabetes more than seven times greater than that for other policyholders.[7]

Race as a factor. — Diabetes was diagnosed relatively much less frequently as a cause of blindness of Negro than of white recipients. It was assigned for only 0.7 percent of the Negro, but for 1.7 percent of the white recipients.

Present age. — The adjusted-age tabulation indicates that the age of more than a third of persons now blind as a result of diabetes is between 60 and 69 years, and that more than 90 percent have passed age 50. The average present age for this etiology is considerably lower, however, than that for vascular disease.

Age at onset. — The modal age of occurrence of blindness for the diabetic cases was 50–59 years. Onset in that age interval was reported for two-fifths of the cases.

State differences. — Massachusetts reported the largest proportion of diabetic blindness, as it did also of blindness resulting from vascular

[7] "Mortality of the Blind," *Statistical Bulletin, Metropolitan Life Insurance Company*, Vol. 16, No. 9 (September 1935), p. 2.

diseases. Rhode Island and North Dakota, each with very few recipients, also reported as much as 3 percent of their cases in this category. At the other extreme, in five Southern States less than 1 percent of all cases in the State were attributed to diabetes. Arkansas, which had the second highest percentage of cases attributed to vascular diseases, reported no cases at all of diabetic origin.

State	*Cases of diabetes as percent of all cases*
20 States	1.5
Massachusetts	3.8
Rhode Island	3.1
#North Dakota	3.0
#Iowa	2.5
#Kansas	2.3
#Wisconsin	2.2
#Indiana	1.8
*New Jersey	1.7
#New Hampshire	1.7
Connecticut	1.6
#Washington	1.5
*Maryland	1.4
*Louisiana	1.2
West Virginia	1.1
South Dakota	1.1
*South Carolina	.6
*#Virginia	.5
*Tennessee	.3
Oklahoma	.2
*#Arkansas	

#State in which more than one-third of the recipients were 65 years of age or over. See table 7.

*State in which more than one-fifth of the recipients were Negroes. See table 6.

Prenatal Origin, Not Elsewhere Classified

As indicated by its title, this category is intended to embrace only part of the cases of blindness arising from causes that existed before birth. The relatively frequent cases resulting from infections acquired before birth, including congenital syphilis, and the rare cases that may result from prenatal trauma or chemical poisonings should be classified with other cases of those etiologies. Similarly the plan of classification places all instances of blindness resulting from neoplasms in that category, whether or not the causal factor is regarded as having been present before birth.

The remaining causes having prenatal origin are chiefly those that are inherent in the germ plasm — in other words the true hereditary causes — and in addition a residual group of causes, neither hereditary nor belonging in any of the other specific etiological categories, that result, probably rarely, in developmental abnormalities entailing blind-

ness. A maternal toxemia disturbing the normal development of the embryo might be such a cause.[8]

The inheritance of blindness is of such great social importance that it would be desirable to place in a separate category of the etiological classification all cases attributable to inherited factors. This has not been done because of two serious difficulties that stand in the way of assigning a definite diagnosis of heredity in many instances in which it is a possible or even a suspected cause. The first is that most types of inherited eye defect are paralleled by closely similar conditions arising from other causes. Therefore, the diagnosis of heredity should not be made without confirmation by evidence that the defect has occurred in other members of the family in accordance with the expected mode of transmission.

The second difficulty is that the full investigation of family history needed in order to distinguish hereditary from other causes in such cases is time-consuming and requires in most instances search beyond the immediate interview. Often, unfortunately, the needed information cannot be obtained at all.

In view of these practical difficulties the present category combines, but attempts to distinguish, three groups of cases: (1) those for which there was evidence in the family history to support a definite diagnosis of heredity; (2) those for which there was some, but less conclusive, evidence of inheritance; and (3) all others that do not belong in other categories and of which the cause was considered as having been present before birth.

The instructions specified that cases should be classified as of *established hereditary origin* if the eye defect was recognized as inheritable and there was evidence that the same defect had appeared in other members of the family in accordance with the expected mode of transmission. Only 167 cases, or 0.8 percent of the total number, were reported as meeting this specification. This number is certainly much too small to represent the probable extent of inherited blindness among the recipients studied.

Cases were to be classified as of *presumed hereditary origin* if the defect was one recognized as inheritable but there was not conclusive evidence that the same defect had appeared elsewhere in the family in accordance with the expected mode of transmission. In this group were placed 537, or 2.6 of all the cases.

The third division evidently consists largely of cases of congenital defects, many of which may have been of hereditary origin. These cases

[8] A possible illustration of the residual group is some consequence of rubella (German measles) in the mother during the early months of pregnancy. Since 1941, papers by several authors have reported cases of congenital cataract and microphthalmos, as well as abnormalities of other parts of the body, resulting from this cause. If the conclusions of these observers are borne out, and if in such cases the fault of development is caused by transmission from mother to embryo of a toxin rather than the infection itself these cases should be classified here as cases of prenatal origin not belonging in any of the other categories. The evidence concerning blindness resulting from this cause must be considered inadequate as yet. Results of a recent inquiry (Fox, Max J., M. D., and Bortin, Mortimer M., M. D., "Rubella in Pregnancy Causing Malformations in Newborn," *Journal of the American Medical Association*, Vol. 130, No. 9 (Mar. 2, 1946), p. 568), indicate that, although congenital defects may in some cases result from the occurrence of this disease in the mother during pregnancy, they are not a usual consequence.

were more numerous, numbering 1,252, or 6.1 of all cases. Together the three divisions of the category account for 9.5 percent, or nearly a tenth of the total study group. If consideration is omitted of the as yet undemonstrated possibility that hereditary factors may confer a predisposition to such eye defects as myopia and some forms of senile cataract, it can be concluded that inheritance was not responsible for a larger proportion of the recipient cases than this, and it appears probable that the true proportion of hereditary cases is much smaller.

Site and type of affection. — The distribution of cases by type of affection in the three divisions of this category shows interesting correspondence. In each division, the same six type-of-affection categories are the leading ones. The figures for them, taken from table A–1, are as follows:

Cases of prenatal origin not elsewhere classified

Type of affection	Total	Hereditary origin, established	Hereditary origin, presumed	Prenatal origin, cause not specified
Total	1,956	167	537	1,252
Cataract	591	63	137	391
Structural anomalies [1]	401	22	97	282
Retinal degeneration	278	37	159	82
Refractive errors	214	12	33	169
Optic nerve atrophy	153	14	34	105
Amblyopia	69	6	13	50
Other	250	13	64	173

[1] 15 cases of congenital displaced lens are included here that in other tables are included with other cases of dislocated lens.

The 591 cases of cataract are principally cases of congenital cataract, which is a frequently occurring hereditary abnormality but one which may also result from other causes. Most of the cases of congenital cataract found in the study were probably classified here. Analysis of age at onset discloses only 593 cataract cases with onset before 10 years of age.

The cases of structural anomaly include instances of aniridia, albinism, coloboma, ectopia lentis (dislocated lens), megalophthalmos, and microphthalmos, each of which, it is definitely established, may be inherited. Some of these defects appear only rarely as inherited traits. Megalophthalmos, or congenital glaucoma, should probably be included among those not frequently inherited. Altogether, 68 cases, of this anomaly were reported; all but 7 of them are in this category but only 3 were classified as of established hereditary origin.

Albinism, which next to congenital cataract was the most frequently reported developmental anomaly, probably occurs rarely except as a result of inheritance. But only 13 cases of albinism were classified as of established hereditary origin and only 18 as of presumed hereditary origin, while for 45 no specification as to inheritance was made.

Two distinct types of retinal degeneration are hereditary. Familial macular degeneration is of rare occurrence. Retinitis pigmentosa, on the other hand, occurs with considerable frequency. It is a disease seriously

impairing sight and one which all children of an affected parent are liable to transmit. It develops gradually and may become evident in a parent only after children have been born. The diagnosis of retinitis pigmentosa is difficult to make with assurance because the eye condition in this disease resembles other affections involving the retina, especially chorioretinitis, which is a frequent result of syphilis. The 278 cases of retinal degeneration classified here constitute two-fifths of the total number of cases of retinal degeneration. Only 37 of these cases were reported as definitely hereditary; 159 were classified as of presumed hereditary origin.

It has not been established that refractive errors are inherited, although it has often been reported that myopia is. Nearly a third of the cases of refractive error were classified in this general category, but only 12 were reported as of established hereditary origin.

The hereditary form of optic nerve atrophy is Leber's disease, or hereditary partial atrophy of the optic nerve.[9] The symptoms of this degenerative condition usually begin to develop at from 20 to 30 years of age, or again frequently only after children have been born. The disease is believed to be a sex-linked recessive trait, and in accordance with the pattern of this form of inheritance the condition becomes manifest much more frequently in men than in women. Males who are capable of transmitting the trait develop the condition, but the affected males, with possibly rare exceptions, pass the trait on only to their daughters. Females, on the other hand, can carry the trait without exhibiting it, and can pass it on to both sons and daughters. According to the pattern, females develop the disease only if the trait is inherited from both parents, which does not often occur. The 153 cases of optic nerve atrophy classified here are 5 percent of the total number of such cases. Definite evidence of inheritance was reported for only 14 of these cases, and only 34 were designated as of presumed hereditary origin.

Amblyopia is another condition of which the possibility of hereditary origin is not established but which has been reported as appearing repeatedly in certain families. In six such cases a definite diagnosis of heredity was made.

Among the "other" cases in this general group are 13 in which an affection of the cornea was specified but not identified further in the tabulations. They may include cases of degeneration of the cornea, of which there is a familial, or hereditary, form. Included here are also some cases of which the reported type of affection suggests that they do not belong in this etiological group, including some cases of glaucoma (not identified as congenital glaucoma), and larger numbers of cases of both choroiditis and chorioretinitis.

[9] This hereditary condition is sometimes also described as a form of retrobulbar neuritis; see for example, "Diseases of the Optic Nerve," *The Eye and Its Diseases*, edited by Conrad Berens, M. D., 1938, p. 793.

Retinoblastoma is another eye disease of hereditary origin, and it therefore should be mentioned in this discussion. Because it is a neoplasm, such cases, if any, would have been classified with other neoplasms rather than here. Only three cases of retinal neoplasm were reported in the study. Few such cases would be expected among recipients of aid to the blind, in view of the high rate of mortality from these conditions.

Race as a factor. — Only 4.2 percent of the Negroes, as compared with 10.9 percent of the white recipients, were classified in this category. The much lower proportion of Negroes is probably to be explained by generally less adequate eye examinations in the cases of Negro applicants than in those of white applicants for aid to the blind. It is probably significant that the difference between these percentages for the two racial groups, namely 6.7 percent, is almost exactly matched by the difference between their percentages for cases of which the etiology was recorded as undetermined by the physician or was entirely unspecified; in the latter instance the larger percentage was that for the Negro recipients.

The diagnosis of heredity was assumed to be established by the available evidence for only 0.1 percent of the Negroes, as compared with 1.0 percent, or relatively 10 times as many, of the white recipients.

Age at onset. — A determination that the underlying cause of blindness existed prenatally does not necessarily imply that the eye condition preventing sight was already present at birth. In cases of developmental defects, including congenital cataracts and other developmental anomalies, the condition is usually fully manifest at birth or soon thereafter. In cases of hereditary degenerations, however, as already noted, loss of capacity to see occurs later in life, but probably usually before middle age.

Of the nearly 2,000 recipients classified in this category, 56.0 percent were reported as having been born blind or having become so within the first year of life. Another 11.0 percent were found to have lost their sight before reaching 10 years of age. For only 5.8 percent was blindness reported as developing after age 50. For 5.3 percent of these cases the age at occurrence of blindness was not recorded.

State differences. — Rhode Island reported the largest proportion of cases in this category, and the percentage for Connecticut was almost as large. But these are the two States with fewest recipients. Rhode Island's large proportion represents only 12 cases, all of which were reported as of presumed hereditary origin. In addition to Rhode Island, five other States — Louisiana, South Carolina, South Dakota, Virginia, and Washington — recorded no cases of established hereditary origin.

The largest numbers of cases of established hereditary origin were reported by Wisconsin (51), Indiana (24), Iowa (20), West Virginia (20), and Tennessee (17). Together they reported nearly four-fifths of the definitely diagnosed hereditary cases. Oklahoma, with next to the

largest total number of recipients, reported only two cases of established, and none of presumed, heredity.

The States with larger proportions of Negro recipients tend to have lower-than-average proportions of cases classified here, but South Carolina and Louisiana are exceptions to this rule. The three States at the top of the following list are among the four reporting the largest proportions of cases of blindness at birth, South Carolina being the fourth.

State	*Cases of prenatal origin not elsewhere classified as percent of all cases*
20 States	9.5
Rhode Island	18.2
Connecticut	17.5
West Virginia	13.1
Indiana	12.9
Massachusetts	12.9
*South Carolina	11.4
North Dakota	11.3
Iowa	11.2
*Louisiana	10.6
New Hampshire	10.1
South Dakota	9.4
Wisconsin	9.2
*New Jersey	9.2
*Tennessee	8.4
*Maryland	8.1
Kansas	7.6
*Arkansas	7.2
Washington	6.7
Oklahoma	6.1
*Virginia	5.1

*State in which more than one-fifth of the recipients were Negroes. See table 6.

Chapter VIII.

USE OF STATE-FEDERAL PROVISIONS FOR AID TO THE BLIND AND FOR PREVENTION OF BLINDNESS

Although this study was not focused on the administration of aid to the blind, the data compiled nevertheless supply some basis for appraising the effects on the assistance programs of Federal and State laws and policies. In the opinion of the authors, the study supplies evidence of need for amending the Social Security Act to enable States to finance broader programs of assistance and services for blind persons and persons threatened with blindness. The Social Security Board has made a number of recommendations to that end.[1]

Without extension of Federal participation, many States will be seriously handicapped in developing adequate programs of assistance and services for the blind. Within the framework of existing legislation, however, much can be done to improve and extend care of blind persons and those in danger of becoming blind. Fuller use by the States of Federal funds already available could prevent the occurrence of important amounts of blindness and improve the condition of many persons now blind.

Fuller Use of Provisions of Title X

Many States are unnecessarily restricting their present provisions of financial assistance to needy blind persons by imposing limitations on this type of aid. Title X of the Social Security Act authorizes Federal financial participation in assistance to any needy blind person who is not a resident of a public institution. Yet many of the State plans exclude from such aid other groups of blind persons.

Inclusion of blind children. — Almost half the State laws now limit eligibility for aid to the blind to adults. One reason for the exclusion of blind children has been that they are less likely than blind adults to be needy. A further reason is that many blind children are attending residence schools for the blind, but such children are customarily in their homes during vacations and may be there also over weekends. A blind child may need aid to make it possible for him to attend a residential school for educational purposes. Sometimes blind children fail to get the specialized formal training they need because their families cannot afford the expense of transportation to and from home, clothing, and incidental costs of school attendance. Moreover, some blind children now attending residential schools suffer hardship because inadequate provision is made for these purposes.

[1] *Annual Report of the Federal Security Agency; Section Six, Social Security Board, 1946*, pp. 430-431.

There are also some blind children not attending residential schools who would benefit from aid to the blind. A needy blind child can get aid to dependent children — also financed partly from Federal funds — only if he is deprived of parental support by the death, continued absence from home, or incapacity of a parent. If the child is ineligible for either aid to the blind or aid to dependent children, his only recourse is to general assistance, which in many places is meager and in some places lacking.

Little justification can be found for erecting barriers to prevent blind children from receiving aid to the blind either because the numbers in need of such help are not large or because alternative programs may provide suitable help for some of them. It should be recognized that blind children have special needs because of their blindness and that, therefore, they should be eligible to receive help from the special programs for blind persons maintained by the States.

Use of old-age assistance for aged blind. — Many older persons who are blind and in need are now receiving old-age assistance rather than aid to the blind. Some of the blind elders on the old-age assistance rolls formerly received aid to the blind but were transferred to old-age assistance on attaining age 65; some were blind at the time of acceptance for old-age assistance and had not previously received aid to the blind; and some became blind after they had begun to receive old-age assistance.

An elderly blind person may fare as well under old-age assistance as under aid to the blind if his special needs are recognized, but it is probable that the special requirements of older blind persons are often overlooked in considering their needs as recipients of old-age assistance. Failing vision so commonly is a result of the aging process that the blindness of recipients of old-age assistance may fail to be recognized as a special problem, or may even be overlooked entirely.

A program of case-finding within the category of old-age assistance would probably increase greatly the number of known blind persons in some States. In the States in which blind persons are included in the program of old-age assistance, means should be provided for their identification and medical examination, and medical services should be made available whenever the medical examination reveals possibility of improving vision or of preventing further visual loss.

Provision for needy blind in rural areas. — There is indication that in some States blind persons living on farms and in small towns are being reached less effectively by aid to the blind than those in the larger centers of population. A possible reason is found in the difficulties of providing eye examinations to applicants in the outlying areas. These difficulties may offer part of the explanation for the use of old-age assistance as a means of meeting the needs of elderly blind persons. But generally there is probably less awareness of the availability of aid for the needy blind in rural places than in cities.

Some States have made special efforts to extend to persons in the small communities the benefits of programs of assistance and services for the blind. To provide ophthalmological examinations and other services in the remote parts of the State, for example, the New Jersey Commission for the Blind has recently established an eye clinic on wheels.[2] This mobile eye unit — patterned after the mobile optical units used by the armed forces during the war — has equipment for eye examinations, refractions, and minor treatments and operations.

Provision for Negroes and Indians. — In some States the numbers of Negroes and Indians receiving aid to the blind is low in relation to the probable numbers of blind persons of these races in need. Blind Negroes and Indians are less likely than blind white persons to come to the attention of agencies administering assistance or services for the blind, partly because they are less likely than white persons to have information concerning the aid for which they are eligible. Special provisions are therefore needed for finding cases of blindness among Negroes and Indians. Policies or practices which tend in some States to reduce the availability of aid to the blind persons in these groups should be revised.

Use of program for persons not totally blind. — The study has shown that most of the participating States make unexpectedly small use of aid to the blind to help needy persons having seriously reduced vision but more than motion perception. Of all the recipients studied, more than three-fourths had less than "traveling sight."[3] Fuller use should be made of the opportunity to provide financial assistance to needy persons who meet the definition of economic blindness, but have some useful vision. There is, in fact, great need for promoting wide understanding of the concept of economic blindness and of the possibility of aiding persons who are less than totally blind under the State programs of aid to the blind.

Medical Care for the Needy Blind

Because of the nature of their handicap, blind persons have exceptional need for medical care. Yet this is a need for which adequate provision is lacking under many State programs for aid to the blind. Limitations of the provisions of title X governing Federal participation in assistance costs are to considerable extent responsible. More nearly adequate provision of medical care for needy persons with serious visual loss could materially reduce the problem of blindness by restoring sight of some and arresting or retarding the progress of the conditions of others.

Recommendations of physicians for treatment of recipients. — As stated in chapter II, the participating State agencies were asked to record for each recipient whether the record of eye examination showed that

[2] *Journal of the American Medical Association*, Vol. 132, No. 8 (Oct. 26, 1946), p. 463.
[3] For definition of "traveling sight" see p. 31.

the examining physician had recommended treatment to conserve or improve vision and, if so, the type of treatment recommended. The specified categories of treatment were operation on the eye, other treatment of the eye, provision of glasses, and systemic treatment. The State reports showed that for nearly one-fourth of the total group of recipients studied, one or more types of treatment had been recommended. Undoubtedly the proportion of recipients for whom care was needed was larger, because in many States, funds available for medical care of recipients of aid to the blind are meager or lacking. Moreover, in many States specialized medical services are extremely limited. It is probable that physicians do not uniformly record a recommendation for indicated treatment if there is no expectation of making it available.

For nearly two-thirds of the approximately 4,800 recipients for whom a recommendation was recorded, the treatment recommended was an eye operation. For 1 in 5 of the recipients other treatment of the eye was recommended; for 3 in 10, glasses were recommended; systemic treatment was prescribed for 1 in 5.

The cause data suggest that generally more than has been attempted thus far can be done to conserve or improve the vision of persons on the aid to the blind rolls. They point also to the conclusion that adequate provision of specialized medical care for persons who do not yet fall within the definition of economic blindness, but who have eye conditions that if not arrested will result in progressive loss of vision, could prevent a large amount of blindness.

Some authorities believe that two-thirds or more of all blindness is preventable. No attempt has been made in this report to estimate how much of the recipient blindness could have been prevented. To gauge even approximately how much might be done to conserve or improve the vision of recipients in each State would require careful medical evaluation of the individual case records. Some of the cause statistics, however, suggest large possibilities for restoration of vision and prevention of blindness, provided appropriate medical service is given in time.

One-fifth of all recipients covered by this study were reported as having cataract. The examining physician had recommended treatment for somewhat more than half the recipients for whom cataract was the reported eye defect. Had appropriate care been available at the proper time, for a large proportion of them useful vision could presumably have been restored.

More than one-sixth of the recipients were blind as a result of affections of the cornea. For at least some of them, corneal transplantation might even now be feasible.

The reported eye condition of one-tenth of the recipients was glaucoma. For them, early diagnosis and continuing medical care might at least have postponed the failure of vision for a long period. There is still great need for spreading the information that early detection and

sustained treatment of this condition is necessary if blindness is to be avoided.

There can be little doubt that of all specific causes of blindness among the recipients, syphilis was responsible for the largest amount of preventable visual loss. Early diagnosis and treatment can now prevent most blindness from this cause. But some syphilitic blindness undoubtedly still occurs, indicating the urgency of even greater efforts to control this disease. Such measures as premarital blood tests, blood tests of women in early pregnancy and mass serological surveys together with provisions for free treatment have proved effective in preventing blindness from this cause.

Trachoma accounted for the blindness of about 1 in 13 of the recipients studied. Although most of this blindness occurred before the present methods of treating the disease were in use, trachoma is still causing needless blindness in this country. In this disease damage to the cornea occurs only gradually and proper treatment can improve vision even in cases in which it is already seriously reduced.

Difficulties of providing medical care under title X. — Title X of the Social Security Act authorizes the Federal government to share in the cost of money payments to recipients up to a maximum of $45 a month, but it cannot share in the cost of medical service for which payment is made directly by the public assistance agency to a doctor, clinic, or hospital. Many public assistance agencies do not make money payments to recipients of more than $45 a month. Unless a recipient has other resources, assistance of this amount is not likely to enable him to obtain more than minor medical care. Assistance agencies can, and often do, include small amounts in the money payment over a period of many months to enable recipients to pay medical bills in installments. But this procedure is administratively wasteful, as well as unsatisfactory to those supplying medical care. As a result, it fails to serve as a means of obtaining much of the medical service that is needed.

In some States with relatively small economic resources few, if any, payments are as large as $45. In these States, especially, recipients of aid to the blind are likely to go without the medical care which might improve their conditions.

Not infrequently State agencies administering aid to the blind make some direct payments for medical services supplied to recipients, meeting the cost entirely from State and local funds. But for the most part such payments are made only in the more urgent instances.

Other State provisions for medical care for the blind. — Several States operate programs of prevention of blindness under which medical care is made available not only to recipients of aid to the blind but to other persons having serious visual defects who are unable to pay for their own treatment. Many States, also supply some medical care from general assistance or special funds to needy persons who are blind or are becoming blind. Such provision is, however, uneven.

Through programs other than aid to the blind the Federal government makes grants-in-aid to States that can be used in part for providing medical care to blind persons and for preventing blindness.

For blind persons of employable age who are potentially employable or can become more advantageously employed, rehabilitation services are available under State programs of vocational rehabilitation for which the Federal Government makes grants-in-aid. In addition to counseling and guidance in preparation for employment, these services include physical examination, necessary medical, surgical and psychiatric treatment, and hospitalization. Other services provided are training for a job; necessary maintenance and transportation during rehabilitation; needed occupational tools, equipment, and licenses; and job placement.

The Office of Vocational Rehabilitation of the Federal Security Agency interprets Public Law No. 113, under which it administers these grants, as making it possible for persons receiving aid to the blind to be given vocational rehabilitation services. The variety of jobs for which blind persons may be prepared through rehabilitation services is broad in scope and includes jobs in many occupational fields, whether as technician or factory worker at standard rates of pay, or in service jobs, such as agricultural worker or housewife for which remuneration may in part at least be in terms of maintenance. It seems probable that States generally are not now taking full advantage of these interpretations of the Federal law.

In most States, blind children with eye conditions for which surgical care is indicated now come within the scope of the crippled children's program, usually administered by the Health Department. Only a negligible number of blind children — primarily those with congenital cataracts — have been afforded treatment under these programs, which are financed in part from Federal funds.[4] It would be possible under Federal legislation for States to regard any blindness as a crippling condition and to extend their plans to make it possible for them to provide any type of medical care needed to improve or conserve the vision of blind children.

The State programs of maternal and child health, which are administered by State Health Departments and to which the Federal Government contributes financial support, provide services that are in all probability resulting in some reduction in the amount of congenital blindness and in some early detection of visual defects among children.[5] Types of service in these programs include prenatal and postnatal care for mothers, well-baby clinics, clinics for preschool children, health supervision through the public health nurse, immunization and preventive services, and school health programs for case-finding of defects among school children. Under the provisions of title V part 1

[4] Grants-in-aid for crippled children's services are administered by the U. S. Children's Bureau of the Federal Security Agency under title V, part 2 of the Social Security Act.

[5] Grants-in-aid for maternal and child health are administered by the U. S. Children's Bureau of the Federal Security Agency under title V, part 1 of the Social Security Act.

of the Social Security Act, services can include the correction of the defects found. Unfortunately, services under the programs of maternal and child health often are limited in scope and are not equally available in all parts of the State.

The U. S. Public Health Service of the Federal Security Agency makes grants-in-aid to States to help the counties and local health districts establish and maintain adequate public health services.[6] Local health agencies carry on various services, including case-finding, health education, sanitation, immunization, and other services to protect and improve public health. Of special importance in combating blindness are the programs of venereal-disease and tuberculosis control. It would be possible for State or local public health agencies under these grants to employ specialized eye workers to work with general public health nurses, school teachers, social workers, and others in efforts aimed at the prevention of blindness.

If blindness is to be effectively combatted close coordination and full use of all public and private resources available for prevention and treatment of visual loss is essential.

[6] These grants are made under section 314(c), part B, title III of Public Law No. 410, 78th Congress.

Appendix A.

BASIC TABULATIONS OF CAUSES OF BLINDNESS

					1				1		
			2		2				2	4	58
2	2				386	22	90	274	1	1	13
					76	13	18	45			1
					20		1	19			
					61	3	21	37	1	1	4
					58	4	14	40			3
					8		5	3			
					17	1	2	14			
					97	1	20	76			2
					40		9	31			2
					9			9			1
			1	2	34		4	30	3		215
3	1		1	2	23		3	20	4		194
2	1				9			9	4		10
1					2		1	1			11
			1		5	2		3	3		4
2	1		1	1	13		3	10	4		79
		8	12	2	29	2	9	18	57		757
14	4	2			1			1			72
		1	1						1		2
		1	7		4		2	2	7		338
12	1		2	1	6		1	5	2		170
2					1			1	2		7
	1	1							2		22
	2	3	1		13	2	5	6	41		62
			1	1	4		1	3	2		84
		2	14	10	7	1		6	18		469
5	1		3	6					3		94
1		1	11	2	4			4			337
4	1	1		2	1			1	1		23
					1			1	13		14
					1	1					
									1		1
		2	6	8	606	63	144	399	2,844		254
		2	5	8	591	63	137	391	2,840		242
			1		15		7	8	3		12
									1		
8	1	12	14	11	378	43	194	141	347		862
			2	3	27		15	12	7		217
		5	6	1	6	1		5	6		85
		7	3	3	58	4	17	37	13		355
6			3	1	3		1	2	37		97
1				2					1		31
					278	37	159	82	279		57
1	1										4
					5		2	3	4		8
			1		1	1					8
15	1	6	19	10	173	15	43	115	40		1,408
12		4	16	10	153	14	34	105	36		1,270
3			2		6	1	3	2	1		66
											5
		2	1		3		1	2			35
	1				3		1	2	3		25
					5		1	4			2
					3		3				5
		1			2			2			13
		1	4		93	6	16	71	13		194
			2		69	6	13	50	4		40
			1		7		3	4	6		33
		1	1		17			17	3		121

Table A-1.—*Master table: Site and type of affection by etiology, recipients of aid to the blind, 20 States*

| Site and type of affection | Total | Etiology | | |

Table A–2.—*Number and percentage distribution of recipients of aid to the blind by site and type of affection and by etiology for each type of affection, 20 States* [1]

Site and type of affection and etiology	Number of recipients	Percentage distribution by—		
		Site and type of affection		Etiology for each type of affection
		Unadjusted for age	Adjusted for age	
TOTAL	20,591	100.0	100.0	.....
EYEBALL IN GENERAL	*4,690*	*22.8*	*23.2*	.....
Glaucoma	*2,170*	*10.5*	*11.7*	*100.0*
Unknown to science	2,061	.....	.....	95.0
Undetermined or not specified	51	.....	.....	2.3
Other	58	.....	.....	2.7
Refractive errors	*708*	*3.4*	*3.1*	*100.0*
Prenatal origin, n. e. c.[2]	214	.....	.....	30.2
Unknown to science	475	.....	.....	67.1
Undetermined or not specified	15	.....	.....	2.1
Other	4	.....	.....	.6
Panophthalmitis and acute endophthalmitis	*276*	*1.4*	*1.2*	*100.0*
Infectious diseases	115	.....	.....	41.7
Trauma	95	.....	.....	34.4
Undetermined or not specified	58	.....	.....	21.0
Other	8	.....	.....	2.9
Structural anomalies	*403*	*2.0*	*2.3*	*100.0*
Prenatal origin, n. e. c.	386	.....	.....	95.8
Undetermined or not specified	13	.....	.....	3.2
Other	4	.....	.....	1.0
Degenerative changes	*805*	*3.9*	*3.5*	*100.0*
Ophthalmia neonatorum	95	.....	.....	11.8
Infectious diseases, other	145	.....	.....	18.0
Trauma	297	.....	.....	36.9
Prenatal origin, n. e. c.	34	.....	.....	4.2
Undetermined or not specified	215	.....	.....	26.7
Other	19	.....	.....	2.4
Other affections of the eyeball, specified	*86*	*.4*	*.3*	*100.0*
Trauma	65	.....	.....	75.6
Other	21	.....	.....	24.4
Affections of the eyeball, not specified	*242*	*1.2*	*1.1*	*100.0*
Infectious diseases	44	.....	.....	18.2
Trauma	90	.....	.....	37.2
Prenatal origin, n. e. c.	13	.....	.....	5.4
Undetermined or not specified	79	.....	.....	32.6
Other	16	.....	.....	6.6
CORNEA	*3,656*	*17.8*	*16.0*	.....
Keratitis, interstitial	*232*	*1.1*	*.9*	*100.0*
Syphilis	143	.....	.....	61.6
Infectious diseases, other	11	.....	.....	4.8
Undetermined or not specified	72	.....	.....	31.0
Other	6	.....	.....	2.6
Keratitis, phlyctenular	*18*	*.1*	*.1*	.....
Keratitis, ulcerative	*1,277*	*6.2*	*5.8*	*100.0*
Gonorrhea, n. e. c.	46	.....	.....	3.6
Ophthalmia neonatorum	227	.....	.....	17.8
Trachoma	265	.....	.....	20.7
Infectious diseases, other	233	.....	.....	18.2
Trauma	144	.....	.....	11.3
Undetermined or not specified	338	.....	.....	26.5
Other	24	.....	.....	1.9
Keratitis, not specified	*331*	*1.6*	*1.4*	*100.0*
Syphilis	23	.....	.....	6.9
Trachoma	32	.....	.....	9.7
Infectious diseases, other	54	.....	.....	16.3
Trauma	40	.....	.....	12.1
Undetermined or not specified	170	.....	.....	51.4
Other	12	.....	.....	3.6

See footnotes at end of table.

Table A–2.—*Number and percentage distribution of recipients of aid to the blind by site and type of affection and by etiology for each type of affection, 20 States* [1]—Continued

Site and type of affection and etiology	Number of recipients	Percentage distribution by—		
		Site and type of affection		Etiology for each type of affection
		Unadjusted for age	Adjusted for age	
Pannus	*545*	*2.7*	*2.3*	*100.0*
Trachoma	529			97.1
Other	16			2.9
Ulceration and vascularization	*711*	*3.5*	*2.9*	*100.0*
Trachoma	599			84.2
Infectious diseases, other	69			9.7
Trauma	15			2.1
Undetermined or not specified	22			3.1
Other	6			.9
Other affections of the cornea, specified	*329*	*1.6*	*1.5*	*100.0*
Ophthalmia neonatorum	16			4.9
Trachoma	25			7.6
Infectious diseases, other	25			7.6
Trauma	107			32.5
Neoplasms	28			8.5
Prenatal origin, n. e. c	13			4.0
Unknown to science	41			12.5
Undetermined or not specified	62			18.8
Other	12			3.6
Affections of the cornea, not specified	*213*	*1.0*	*1.1*	*100.0*
Trachoma	49			23.0
Infectious diseases, other	36			16.9
Trauma	34			16.0
Undetermined or not specified	84			39.4
Other	10			4.7
IRIS AND CILIARY BODY	*1,594*	*7.7*	*6.8*	
Iritis	*185*	*.9*	*.8*	*100.0*
Septicemia	11			5.9
Syphilis	30			16.2
Infectious diseases, other	23			12.5
Trauma	11			5.9
General diseases, n. e. c	12			6.5
Undetermined or not specified	94			50.8
Other	4			2.2
Iridocyclitis and uveitis	*755*	*3.7*	*3.1*	*100.0*
Septicemia	57			7.6
Syphilis	98			13.0
Tuberculosis	30			4.0
Infectious diseases, specified, other	28			3.7
Infectious diseases, not specified	114			15.1
Trauma	68			9.0
General diseases, n. e. c	19			2.5
Prenatal origin, n. e. c	4			.5
Undetermined or not specified	337			44.6
Keratoiritis	*96*	*.4*	*.5*	*100.0*
Septicemia	10			10.4
Syphilis	15			15.6
Infectious diseases, other	27			28.1
Trauma	15			15.6
Undetermined or not specified	23			24.0
Other	6			6.3
Sympathetic ophthalmitis	*552*	*2.7*	*2.4*	*100.0*
Trauma	521			94.4
Unknown to science	13			2.4
Undetermined or not specified	14			2.5
Other	4			.7
Affections of the iris and ciliary body, other	*6*	(2)	(2)	

See footnotes at end of table.

Table A–2.—*Number and percentage distribution of recipients of aid to the blind by site and type of affection and by etiology for each type of affection, 20 States* [1]—Continued

Site and type of affection and etiology	Number of recipients	Percentage distribution by—		
		Site and type of affection		Etiology for each type of affection
		Unadjusted for age	Adjusted for age	
CRYSTALLINE LENS	*4,065*	*19.7*	*24.6*	.....
Cataract	*4,019*	*19.5*	*24.4*	*100.0*
Infectious diseases	48	.....	.....	1.2
Trauma	162	.....	.....	4.0
Diabetes	105	.....	.....	2.6
General diseases, n. e. c., other	28	.....	.....	.7
Prenatal origin, n. e. c.	591	.....	.....	14.7
Unknown to science	2,840	.....	.....	70.7
Undetermined or not specified	242	.....	.....	6.0
Other	3	.....	.....	.1
Dislocated lens	*44*	*.2*	*.2*	*100.0*
Trauma	13	.....	.....	29.5
Prenatal origin, n. e. c.	15	.....	.....	34.1
Undetermined or not specified	12	.....	.....	27.3
Other	4	.....	.....	9.1
Other affections of the lens, specified	*2*	(2)	(2)	.....
CHOROID AND RETINA	*2,635*	*12.8*	*12.4*	.....
Choroiditis	*378*	*1.8*	*1.8*	*100.0*
Septicemia	15	.....	.....	4.0
Syphilis	40	.....	.....	10.6
Infectious diseases, other	39	.....	.....	10.3
Trauma	12	.....	.....	3.2
General diseases, n. e. c.	21	.....	.....	5.5
Prenatal origin, n. e. c.	27	.....	.....	7.1
Unknown to science	7	.....	.....	1.9
Undetermined or not specified	217	.....	.....	57.4
Retinitis	*318*	*1.6*	*1.6*	*100.0*
Septicemia	11	.....	.....	3.4
Syphilis	15	.....	.....	4.7
Infectious diseases, other	13	.....	.....	4.1
Trauma	12	.....	.....	3.8
Diabetes	103	.....	.....	32.4
General diseases, n. e. c., other	67	.....	.....	21.1
Undetermined or not specified	85	.....	.....	26.7
Other	12	.....	.....	3.8
Chorioretinitis	*763*	*3.7*	*3.5*	*100.0*
Septicemia	31	.....	.....	4.1
Syphilis	127	.....	.....	16.6
Infectious diseases, other	79	.....	.....	10.4
Trauma	28	.....	.....	3.7
General diseases, n. e. c.	72	.....	.....	9.4
Prenatal origin, n. e. c.	58	.....	.....	7.6
Unknown to science	13	.....	.....	1.7
Undetermined or not specified	355	.....	.....	46.5
Detached retina	*220*	*1.1*	*1.0*	*100.0*
Infectious diseases	9	.....	.....	4.1
Trauma	69	.....	.....	31.4
Unknown to science	37	.....	.....	16.8
Undetermined or not specified	97	.....	.....	44.1
Other	8	.....	.....	3.6
Retinal hemorrhage	*127*	*.6*	*.7*	*100.0*
Trauma	10	.....	.....	7.9
Diabetes	44	.....	.....	34.6
General diseases, n. e. c., other	35	.....	.....	27.6
Undetermined or not specified	31	.....	.....	24.4
Other	7	.....	.....	5.5
Retinal degeneration	*687*	*3.3*	*3.0*	*100.0*
Syphilis	11	.....	.....	1.6
Infectious diseases, other	26	.....	.....	3.8
Trauma	6	.....	.....	.9
General diseases, n. e. c.	30	.....	.....	4.4
Prenatal origin, n. e. c.	278	.....	.....	40.4
Unknown to science	279	.....	.....	40.6
Undetermined or not specified	57	.....	.....	8.3

See footnotes at end of table.

Table A–2.—*Number and percentage distribution of recipients of aid to the blind by site and type of affection and by etiology for each type of affection, 20 States*[1]—Continued

Site and type of affection and etiology	Number of recipients	Percentage distribution by—		
		Site and type of affection		Etiology for each type of affection
		Unadjusted for age	Adjusted for age	
Arteriosclerotic disease of choroid and retina	*82*	*0.4*	*0.5*	*100.0*
Vascular diseases	72			87.8
Other	10			12.2
Other affections of the choroid and retina, specified	*43*	*.2*	*.2*	
Affections of the choroid and retina, not specified	*17*	*.1*	*.1*	
OPTIC NERVE, VISUAL PATHWAYS AND CENTERS	*3,461*	*16.8*	*14.7*	
Optic nerve atrophy	*3,056*	*14.8*	*12.8*	*100.0*
Meningitis	59			1.9
Septicemia	39			1.3
Syphilis	927			30.3
Infectious diseases, specified, other	66			2.1
Infectious diseases, not specified	36			1.2
Trauma	136			4.5
Poisonings	66			2.2
Neoplasms	65			2.1
Vascular diseases	85			2.8
Diseases of the central nervous system	75			2.5
General diseases, n. e. c., other	43			1.4
Prenatal origin, n. e. c	153			5.0
Unknown to science	36			1.2
Undetermined or not specified	1,270			41.5
Optic neuritis	*182*	*.9*	*.8*	*100.0*
Meningitis	12			6.6
Septicemia	24			13.2
Syphilis	33			18.1
Infectious diseases, other	11			6.1
Trauma	10			5.5
General diseases, n. e. c	13			7.1
Undetermined or not specified	66			36.3
Other	13			7.1
Papilledema	*22*	*.1*	*.1*	*100.0*
Neoplasms	8			36.4
Other	14			63.6
Neuroretinitis	*68*	*.3*	*.3*	*100.0*
Infectious diseases	21			30.9
Undetermined or not specified	35			51.5
Other	12			17.6
Retrobulbar and intracranial lesions	*103*	*.5*	*.5*	*100.0*
Infectious diseases	22			21.3
Trauma	12			11.7
Poisonings	11			10.7
Neoplasms	11			10.7
General diseases, n. e. c	16			15.5
Undetermined or not specified	25			24.3
Other	6			5.8
Other affections of the optic nerve, specified	*13*	*.1*	*.1*	
Affections of the optic nerve, not specified	*17*	*.1*	*.1*	
VITREOUS	*31*	*.2*	*.1*	*100.0*
Undetermined or not specified	13			41.9
Other	18			58.1

See footnotes at end of table.

Table A-2.—*Number and percentage distribution of recipients of aid to the blind by site and type of affection and by etiology for each type of affection, 20 States* [1]—Continued

Site and type of affection and etiology	Number of recipients	Percentage distribution by—		
		Site and type of affection		Etiology for each type of affection
		Unadjusted for age	Adjusted for age	
MISCELLANEOUS AND ILL-DEFINED	*459*	*2.2*	*2.2*	.....
Amblyopia, undefined	*133*	*.6*	*.6*	*100.0*
General diseases, n. e. c	12	.....	.....	9.0
Prenatal origin, n. e. c	69	.....	.....	51.9
Undetermined or not specified	40	.....	.....	30.1
Other	12	.....	.....	9.0
Other miscellaneous and ill-defined lesions, specified	*64*	*.3*	*.3*	*100.0*
Trauma	10	.....	.....	15.6
Undetermined or not specified	33	.....	.....	51.6
Other	21	.....	.....	32.8
Lesions, not specified	*262*	*1.3*	*1.3*	*100.0*
Syphilis	16	.....	.....	6.1
Infectious diseases, other	25	.....	.....	9.5
Trauma	51	.....	.....	19.5
General diseases, n. e. c	24	.....	.....	9.2
Prenatal origin, n. e. c	17	.....	.....	6.5
Undetermined or not specified	121	.....	.....	46.2
Other	8	.....	.....	3.0

[1] Figures in this table are unadjusted for underrepresentation for ages under 20 and 65 and over, except for percentage distribution by site and type of affection.
[2] Not elsewhere classified.
[3] Less than 0.05 percent.

Table A-3.—*Site and type of affection by State: Percentage distribution of recipients of aid to the blind, 20 States*

Site and type of affection	Total	Ind.	Okla.	Wis.	Tenn.	Iowa	Kans.	Mass.	La.	Ark.	Wash.	Va.	W. Va.	S. C.	N. J.	Md.	N. H.	S. Dak.	N. Dak.	Conn.	R. I.
Total number of recipients	20,591	2,413	2,141	2,014	1,526	1,478	1,388	1,176	1,165	1,103	1,053	1,030	833	800	757	666	297	265	231	189	66
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Eyeball in general	22.8	25.3	14.5	22.1	24.6	22.0	19.1	23.4	24.5	22.9	22.7	25.6	20.3	24.3	25.7	33.8	26.6	21.1	22.5	25.9	34.9
Glaucoma	10.5	13.1	6.8	11.3	8.3	10.3	8.7	9.4	14.7	11.6	12.9	11.4	5.9	8.6	13.9	15.0	13.1	3.4	8.2	9.5	10.6
Refractive errors	3.4	3.6	1.9	3.4	2.8	3.5	3.0	8.5	2.0	.4	6.4	.9	3.9	1.8	5.7	4.4	5.1	4.5	2.6	7.9	7.6
Panophthalmitis and acute endophthalmitis	1.4	.6	.5	.6	1.2	1.0	.6	1.4	1.5	8.4	.3	3.5	.5	1.5	.6	.3	.3	.4	1.7	.5	4.6
Structural anomalies	2.0	2.3	1.0	1.4	1.4	1.8	2.2	3.2	1.5	2.3	1.3	1.2	3.2	3.3	2.6	2.4	2.0	3.0	2.6	2.7	1.5
Degenerative changes	3.9	5.5	3.5	2.1	5.5	2.9	2.4	.5	4.6	.2	1.8	6.2	4.3	7.1	2.9	10.7	2.0	9.8	7.4	4.8	7.6
Other affections of the eyeball, specified	.4	.1	.1	.3	.1	.7	1.6	.....	.1	.....	.....	.2	1.4	1.8	.....	.7	1.7	.....	.....	.....	.....
Affections of the eyeball, not specified	1.2	.1	.7	3.0	5.3	1.8	.6	.4	.1	.....	.....	2.2	1.1	.2	.....	.3	2.4	.....	.....	.5	3.0
Cornea	17.8	19.5	35.4	10.5	19.0	16.7	15.2	15.9	15.0	25.2	9.9	10.4	18.7	14.5	11.7	8.1	8.7	40.8	18.6	10.6	12.1
Keratitis, interstitial	1.1	.9	.6	.5	1.9	.9	.4	1.4	2.4	1.1	.5	.7	2.3	1.0	2.4	1.4	.7	1.5	.9	4.3	3.0
Keratitis, phlyctenular	.1	.1	(1)	.1	.1	.1	.1	.1	.2	.....	.....	.....	.4	.....	.....	.1	.3	.....	.....	.....	.....
Keratitis, ulcerative	6.2	11.1	9.2	2.7	13.1	5.1	4.7	9.7	6.8	4.0	2.1	.4	3.1	7.6	3.2	3.5	3.3	.....	.9	4.2	1.5
Keratitis, not specified	1.6	.4	4.0	1.5	.4	3.2	.6	.....	3.1	.7	.9	.8	1.5	3.4	1.3	2.1	2.7	.4	1.7	.....	6.1
Pannus	2.7	1.2	5.9	.7	2.6	5.9	1.1	.8	1.1	7.0	1.2	.1	7.0	.1	.6	.....	.....	17.4	5.2	.....	.....
Ulceration and vascularization	3.5	4.0	14.7	.....	.....	.1	4.5	2.0	.2	11.5	.2	.2	.1	.1	2.0	.3	.7	19.6	2.2	.5	1.5
Other affections of the cornea, specified	1.6	1.7	1.0	2.9	.9	.9	2.1	1.7	1.0	.9	.9	1.3	4.1	2.0	.9	.7	.7	.8	7.3	1.6	.....
Affections of the cornea, not specified	1.0	.1	(1)	2.1	.....	.5	1.7	.2	.2	.....	4.1	6.9	.2	.3	1.3	.....	.3	1.1	.4	.....	.....
Iris and ciliary body	7.7	8.1	5.1	4.2	11.0	4.9	4.5	8.5	11.8	8.7	6.5	10.4	13.3	12.9	8.7	7.8	9.8	1.5	2.2	9.5	4.5
Iritis	.9	.9	.3	.7	3.2	.1	.7	.1	.9	.....	1.1	.2	.7	3.3	1.3	.6	2.7	.....	.....	2.7	.....
Iridocyclitis and uveitis	3.7	4.2	3.4	.6	4.1	1.4	.7	6.6	8.4	2.3	3.7	7.7	3.2	4.6	5.6	4.7	2.7	.4	.9	2.6	3.0
Keratoiritis	.4	1.2	.....	.1	.1	.5	.9	.3	1.7	.8	.2	.4	.1	.....	.1	.3	.3	.....	.....	.....	.....
Sympathetic ophthalmitis	2.7	1.8	1.4	2.8	3.6	2.8	2.2	1.5	.8	5.5	1.5	2.0	9.3	5.0	1.7	2.2	4.1	1.1	.9	4.2	1.5
Other affections of the iris and ciliary body, specified	(1)	.....	.....	(1)	.....	.1	.....	.....	.....	.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Affections of the iris and ciliary body, not specified	(1)	.....	.....	(1)	.....	.....	.....	.....	.....	.....	.....	.1	.....	.....	.....	.....	.....	.....	.4	.....	.....
Crystalline lens	19.7	15.1	18.2	30.8	17.8	17.9	31.2	15.4	18.3	17.7	20.6	22.9	18.7	16.5	11.0	12.9	25.3	11.7	30.7	20.1	10.6
Cataract	19.5	15.1	18.2	30.6	17.5	17.6	30.8	15.2	18.1	17.7	20.3	22.9	18.7	16.4	10.2	12.3	25.3	11.7	29.9	18.0	7.6
Dislocated lens	.2	.....	.....	.2	.3	.3	.4	.2	.2	.....	.3	.....	.....	.1	.8	.6	.....	.....	.8	2.1	.....
Other affections of the lens, specified	(1)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.0
Affections of the lens, not specified	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Choroid and retina	12.8	14.6	8.2	13.5	10.5	16.1	14.1	18.5	10.6	7.1	16.0	10.6	13.1	8.7	16.8	14.4	12.5	10.9	16.9	14.3	16.7
Choroiditis	1.8	2.2	1.7	.8	3.7	2.4	2.4	.3	1.5	.7	2.7	.8	2.4	2.1	2.0	2.0	1.4	.8	2.6	.5	6.1
Retinitis	1.6	1.7	.9	2.4	1.0	3.3	1.9	.1	.7	.5	2.6	1.1	1.8	1.5	1.7	1.3	1.4	.8	2.6	3.2	.....
Chorioretinitis	3.7	3.9	2.6	2.9	2.7	4.6	3.3	5.1	5.2	3.0	3.3	4.4	4.7	2.4	5.3	4.4	2.3	6.0	2.6	3.2	4.6
Detached retina	1.1	1.2	.8	1.0	1.0	1.3	.4	2.1	.7	.5	1.6	.6	1.0	1.3	2.0	.6	1.0	.....	1.7	2.1	3.0
Retinal hemorrhage	.6	.5	(1)	.7	.5	.3	.8	3.1	.....	.9	.6	.4	.6	.1	1.2	.....	1.4	.....	.....	.....	.....
Retinal degeneration	3.3	4.8	2.1	4.9	1.4	3.8	3.6	5.0	2.3	1.5	3.5	2.5	2.5	.6	4.3	5.6	3.0	3.3	5.6	4.2	1.5
Arteriosclerotic disease of choroid and retina, specified	.4	.....	.1	.5	.1	.1	1.0	2.5	.1	.....	1.0	.1	.....	.5	.3	.1	.3	.....	.9	1.1	.....
Other affections of the choroid and retina, specified	.2	.2	.....	.3	.1	.2	.5	.2	.....	.....	.3	.6	.....	.2	.....	.4	.7	.....	.9	.....	1.5
Affections of the choroid and retina, not specified	.1	.1	.....	.....	.....	.1	.2	.1	.1	.....	.4	.1	.1	.....	.....	.....	1.0	.....	.....	.....	.....
Optic nerve, visual pathways and centers	16.8	16.2	14.9	17.5	15.5	17.8	13.3	17.4	19.4	18.4	14.4	19.0	14.2	19.0	22.1	22.1	15.8	13.2	7.8	19.1	21.2
Optic nerve atrophy	14.8	13.6	14.0	15.7	14.3	16.6	10.6	12.3	18.2	16.1	12.7	17.4	11.6	17.1	20.4	21.0	10.1	10.5	6.9	19.1	21.2
Optic neuritis	.9	1.1	.3	.6	.7	.7	.8	1.2	.8	2.2	.4	.6	1.7	1.5	1.2	.3	2.7	.4	.9	.....	.....
Papilledema	.1	.2	.1	.1	.....	.2	.1	.4	.1	.....	.1	.....	.....	.....	.....	.2	.....	.....	.....	.....	.....
Neuroretinitis	.3	.4	.2	.6	.5	.1	.6	.3	.1	.....	.4	.5	.4	.1	.1	.....	1.4	1.1	.....	.....	.....
Retrobulbar and intracranial lesions	.5	.6	.2	.3	.....	.1	1.0	2.8	.2	.....	.7	.3	.4	.3	.4	.6	1.0	.8	.....	.....	.....
Other affections of the optic nerve, specified	.1	.1	.1	.1	.....	.1	.....	.1	.....	.1	.....	.2	.1	.....	.....	.....	.3	.....	.....	.....	.....
Affections of the optic nerve, not specified	.1	.2	.....	.1	.....	.....	.2	.3	.....	.....	.1	.....	.....	.....	.....	.....	.3	.4	.....	.....	.....
Vitreous	.2	.2	.....	.2	.2	.8	.2	.....	.....	.....	.....	.2	.....	.....	.....	.....	.....	.4	.9	.5	.....
Miscellaneous and ill-defined	2.2	1.0	3.7	1.2	1.4	3.8	2.4	.9	.4	.....	9.9	.9	1.7	4.1	4.0	.9	1.3	.4	.4	.....	.....
Amblyopia, undefined	.6	.6	1.6	.8	.5	1.1	.6	.9	.4	.....	.6	.1	1.0	.2	.1	.....	.....	.....	.4	.....	.....
Other miscellaneous and ill-defined lesions, specified	.3	.1	.....	.1	.1	.4	.1	.....	.....	.....	2.7	.1	.....	1.3	1.5	.....	.3	.....	.....	.....	.....
Lesions, not specified	1.3	.3	2.1	.3	.8	2.3	1.7	.....	.....	.....	6.6	.7	.7	2.6	2.4	.9	1.0	.4	.....	.....	.....

[1]Less than 0.05 percent.

Table A–4.—*Site and type of affection by sex: Percentage distribution of recipients of aid to the blind, 20 States*

Site and type of affection	Site and type of affection for each sex		Sex for each site and type of affection		
	Male	Female	Total	Male	Female
Total number of recipients	12,806	7,785	20,591	12,806	7,785
Total percent	100.0	100.0	100.0	62.2	37.8
Eyeball in general	21.5	24.8	100.0	58.8	41.2
Glaucoma	9.2	12.7	100.0	54.5	45.5
Refractive errors	3.3	3.7	100.0	59.7	40.3
Panophthalmitis and acute endophthalmitis	1.3	1.4	100.0	60.1	39.9
Structural anomalies	1.8	2.2	100.0	56.6	43.4
Degenerative changes	4.1	3.6	100.0	65.6	34.4
Other affections of the eyeball, specified	.6	.1	100.0	86.0	14.0
Affections of the eyeball, not specified	1.2	1.1	100.0	64.9	35.1
Cornea	17.1	18.9	100.0	59.8	40.2
Keratitis, interstitial	.9	1.5	100.0	49.1	50.9
Keratitis, phlyctenular	.1	.1	(1)	(1)	(1)
Keratitis, ulcerative	5.7	6.9	100.0	57.7	42.3
Keratitis, not specified	1.4	2.0	100.0	53.2	46.8
Pannus	2.8	2.4	100.0	66.1	33.9
Ulceration and vascularization	3.3	3.7	100.0	60.1	39.9
Other affections of the cornea, specified	1.8	1.3	100.0	69.0	31.0
Affections of the cornea, not specified	1.1	1.0	100.0	64.8	35.2
Iris and ciliary body	8.3	6.9	100.0	66.2	33.8
Iritis	.9	.9	100.0	60.0	40.0
Iridocyclitis and uveitis	3.5	4.0	100.0	58.8	41.2
Keratoiritis	.5	.5	100.0	61.5	38.5
Sympathetic ophthalmitis	3.4	1.5	100.0	79.3	20.7
Other affections of the iris and ciliary body, specified	(2)	(2)	(1)	(1)	(1)
Affections of the iris and ciliary body, not specified	(2)	.....	(1)	(1)	.....
Crystalline lens	18.3	22.2	100.0	57.5	42.5
Cataract	18.1	22.0	100.0	57.5	42.5
Dislocated lens	.2	.2	(1)	(1)	(1)
Other affections of the lens, specified	(2)	(2)	(1)	(1)	(1)
Affections of the lens, not specified	.....	.....	.....	.....	.....
Choroid and retina	13.2	12.1	100.0	64.2	35.8
Choroiditis	2.0	1.6	100.0	66.1	33.9
Retinitis	1.2	2.1	100.0	48.4	51.6
Chorioretinitis	3.9	3.4	100.0	64.7	35.3
Detached retina	1.3	.7	100.0	76.4	23.6
Retinal hemorrhage	.5	.8	100.0	52.8	47.2
Retinal degeneration	3.7	2.7	100.0	69.9	30.1
Arteriosclerotic disease of choroid and retina	.3	.5	100.0	54.9	45.1
Other affections of the choroid and retina, specified	.2	.2	(1)	(1)	(1)
Affections of the choroid and retina, not specified	.1	.1	(1)	(1)	(1)
Optic nerve, visual pathways and centers	19.3	12.7	100.0	71.5	28.5
Optic nerve atrophy	17.2	10.9	100.0	72.2	27.8
Optic neuritis	.9	.8	100.0	65.4	34.6
Papilledema	.1	.1	(1)	(1)	(1)
Neuroretinitis	.3	.3	100.0	64.7	35.3
Retrobulbar and intracranial lesions	.6	.4	100.0	71.8	28.2
Other affections of the optic nerve, specified	.1	.1	(1)	(1)	(1)
Affections of the optic nerve, not specified	.1	.1	(1)	(1)	(1)
Vitreous	.1	.2	(1)	(1)	(1)
Miscellaneous and ill-defined	2.2	2.2	100.0	62.1	37.9
Amblyopia, undefined	.6	.7	100.0	56.4	43.6
Other miscellaneous and ill-defined lesions, specified	.3	.3	100.0	59.4	40.6
Lesions, not specified	1.3	1.2	100.0	65.6	34.4

[1] Not computed; less than 50 recipients.
[2] Less than 0.05 percent.

Table A–5.—*Site and type of affection by race: Percentage distribution of recipients of aid to the blind, 20 States*

Site and type of affection	Site and type of affection for each race			Race for each site and type of affection			
	White[1]	Negro	Unknown	Total	White[1]	Negro	Unknown
Total number of recipients	16,358	4,177	56	20,591	16,358	4,177	56
Total percent	100.0	100.0	100.0	100.0	79.4	20.3	0.3
Eyeball in general	21.9	26.2	28.6	100.0	76.4	23.3	.3
Glaucoma	9.3	15.2	26.8	100.0	70.0	29.3	.7
Refractive errors	4.0	1.1	.....	100.0	93.8	6.2	.....
Panophthalmitis and acute endophthalmitis	1.1	2.3	.....	100.0	65.2	34.8	.....
Structural anomalies	2.2	1.0	1.8	100.0	89.1	10.7	.2
Degenerative changes	3.6	5.3	.....	100.0	72.5	27.5	.....
Other affections of the eyeball, specified	.4	.5	.....	100.0	77.9	22.1	.....
Affections of the eyeball, not specified	1.3	.8	.....	100.0	85.5	14.5	.....
Cornea	18.9	13.5	10.7	100.0	84.4	15.4	.2
Keratitis, interstitial	.9	2.1	.....	100.0	62.1	37.9	.....
Keratitis, phlyctenular	.1	.1	.....	[2]	[2]	[2]	.....
Keratitis, ulcerative	6.2	6.0	3.6	100.0	80.1	19.7	.2
Keratitis, not specified	1.4	2.2	.....	100.0	72.2	27.8	.....
Pannus	3.3	.2	.....	100.0	98.5	1.5	.....
Ulceration and vascularization	4.2	.7	.....	100.0	95.8	4.2	.....
Other affections of the cornea, specified	1.8	1.0	.....	100.0	87.8	12.2	.....
Affections of the cornea, not specified	1.0	1.2	7.1	100.0	74.6	23.5	1.9
Iris and ciliary body	6.7	11.5	12.5	100.0	69.3	30.2	.5
Iritis	.7	1.7	3.6	100.0	60.0	38.9	1.1
Iridocyclitis and uveitis	2.9	6.6	1.8	100.0	63.5	36.4	.1
Keratoiritis	.4	.7	1.8	100.0	69.8	29.2	1.0
Sympathetic ophthalmitis	2.7	2.5	5.3	100.0	80.1	19.4	.5
Other affections of the iris and ciliary body, specified	[3]	.....	.....	[3]	[3]	.....	.....
Affections of the iris and ciliary body, not specified	[3]	.....	.....	[2]	[3]	.....	.....
Crystalline lens	21.0	15.1	7.1	100.0	84.4	15.5	.1
Cataract	20.8	14.9	7.1	100.0	84.4	15.5	.1
Dislocated lens	.2	.2	.....	[2]	[2]	[2]	.....
Other affections of the lens, specified	[3]	.....	.....	[2]	[2]	.....	.....
Affections of the lens, not specified	.....	.....	.....	.....	.....	.....	.....
Choroid and retina	14.0	8.2	17.9	100.0	86.6	13.0	.4
Choroiditis	1.9	1.5	1.8	100.0	83.1	16.7	.2
Retinitis	1.7	1.0	1.8	100.0	86.2	13.5	.3
Chorioretinitis	3.9	3.1	3.6	100.0	82.7	17.0	.3
Detached retina	1.2	.7	1.8	100.0	86.4	13.2	.4
Retinal hemorrhage	.8	.1	.....	100.0	96.9	3.1	.....
Retinal degeneration	3.8	1.4	7.1	100.0	91.0	8.4	.6
Arteriosclerotic disease of choroid and retina	.4	.2	1.8	100.0	89.0	9.8	1.2
Other affections of the choroid and retina, specified	.2	.1	.....	[2]	[2]	[2]	.....
Affections of the choroid and retina, not specified	.1	.1	.....	[2]	[2]	[2]	.....
Optic nerve, visual pathways and centers	14.9	24.2	12.5	100.0	70.6	29.2	.2
Optic nerve atrophy	12.8	22.8	10.7	100.0	68.6	31.2	.2
Optic neuritis	.9	.9	.....	100.0	78.6	21.4	.....
Papilledema	.1	.1	.....	[2]	[2]	[2]	.....
Neuroretinitis	.3	.2	.....	100.0	89.7	10.3	.....
Retrobulbar and intracranial lesions	.6	.2	1.8	100.0	93.2	5.8	1.0
Other affections of the optic nerve, specified	.1	[3]	.....	[2]	[2]	[2]	.....
Affections of the optic nerve, not specified	.1	[3]	.....	[2]	[2]	[2]	.....
Vitreous	.2	.1	.....	[2]	[2]	[2]	.....
Miscellaneous and ill-defined	2.4	1.2	10.7	100.0	87.4	11.3	1.3
Amblyopia, undefined	.8	.1	.....	100.0	94.7	5.3	.....
Other miscellaneous and ill-defined lesions, specified	.3	.2	3.6	100.0	84.4	12.5	3.1
Lesions, not specified	1.3	.9	7.1	100.0	84.4	14.1	1.5

[1] Includes all races other than Negro and unknown.
[2] Not computed; less than 50 recipients.
[3] Less than 0.05 percent.

Table A–6.—*Site and type of affection by age: Adjusted percentage distribution of recipients of aid to the blind,*[1] *20 States*

Site and type of affection	Site and type of affection for each age group [2]									Age group for each site and type of affection									
	Total	Under 20	20–29	30–39	40–49	50–59	60–69	70–79	80 and over	Total	Under 20	20–29	30–39	40–49	50–59	60–69	70–79	80 and over	Unknown
Total adjusted number of recipients	30,035	1,423	1,162	2,085	3,020	4,582	6,281	6,765	4,703	30,035	1,423	1,162	2,085	3,020	4,582	6,281	6,765	4,703	14
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	4.7	3.9	6.9	10.1	15.3	20.9	22.5	15.7	(3)
Eyeball in general	23.2	32.5	22.0	21.2	21.2	22.9	24.1	25.4	19.1	100.0	6.6	3.7	6.3	9.2	15.0	21.7	24.6	12.8	0.1
Glaucoma	11.7	.1	1.4	3.1	5.5	9.9	13.8	18.0	15.4	100.0	(3)	.5	1.8	4.7	12.9	24.7	34.7	20.6	.1
Refractive errors	3.1	4.8	3.8	3.6	4.1	4.2	3.6	2.4	.8	100.0	7.5	4.8	8.1	13.3	20.5	24.4	17.6	3.8	.....
Panophthalmitis and acute endophthalmitis	1.2	1.0	1.5	1.8	1.7	1.4	1.3	.8	.6	100.0	4.0	4.8	10.9	15.1	18.6	22.6	15.7	8.3	.....
Structural anomalies	2.3	19.3	7.4	4.8	2.8	1.5	.9	.2	.2	100.0	39.6	12.4	14.3	12.2	9.9	7.9	2.2	1.4	.1
Degenerative changes	3.5	5.5	4.6	5.7	5.1	4.6	3.0	2.7	1.6	100.0	7.3	5.1	11.1	14.4	19.8	17.9	17.1	7.2	.1
Other affections of the eyeball, specified	.3	.5	1.0	.5	.6	.3	.4	.2	.2	100.0	6.5	11.2	10.3	15.9	15.0	23.4	9.3	8.4	.....
Affections of the eyeball, not specified	1.1	1.3	2.3	1.7	1.4	1.0	1.1	1.1	.3	100.0	5.6	8.4	10.9	13.4	13.7	21.8	22.1	4.1	.....
Cornea	16.0	12.1	17.6	20.5	20.3	18.9	18.7	13.5	9.4	100.0	3.6	4.2	8.9	12.7	18.0	24.4	18.9	9.2	.1
Keratitis, interstitial	.9	1.7	2.3	2.2	1.9	1.1	.6	.3	.1	100.0	9.2	9.9	16.5	20.6	19.5	14.7	7.4	2.2	.....
Keratitis, phlyctenular	.1	.2	.2	.2	.2	(3)	.1	.....	.....	(4)	(4)	(4)	(4)	(4)	(4)	(4)	.....	.....	.....
Keratitis, ulcerative	5.8	8.2	7.7	8.4	7.1	6.0	6.3	4.7	3.0	100.0	6.7	5.2	10.2	12.4	15.9	23.0	18.3	8.2	.1
Keratitis, not specified	1.4	.6	2.1	2.3	1.6	1.7	1.6	1.2	1.0	100.0	2.1	5.8	11.1	11.1	17.9	22.5	18.1	11.1	.3
Pannus	2.3	.1	1.5	2.2	2.6	3.3	3.3	1.7	1.8	100.0	.2	2.4	6.4	11.1	21.3	29.4	16.8	12.2	.2
Ulceration and vascularization	2.9	.1	1.5	3.0	4.1	4.3	4.2	2.3	1.2	100.0	.1	1.9	7.1	14.1	22.3	30.3	18.0	6.2	.....
Other affections of the cornea, specified	1.5	.6	1.7	1.3	1.6	1.5	1.7	1.9	1.2	100.0	1.7	4.3	5.9	10.9	14.5	23.7	27.1	11.9	.....
Affections of the cornea, not specified	1.1	.6	.6	.9	1.2	1.0	.9	1.4	1.1	100.0	2.8	2.2	5.9	11.5	15.0	17.1	29.6	15.9	.....
Iris and ciliary body	6.8	7.0	9.6	9.4	10.0	8.9	7.3	4.9	2.7	100.0	4.9	5.5	9.6	14.8	20.0	22.5	16.4	6.3	(3)
Iritis	.8	.1	.8	.8	1.2	1.1	.9	.8	.3	100.0	.8	3.8	7.2	15.3	20.3	23.3	22.5	6.8	.....
Iridocyclitis and uveitis	3.1	2.6	4.7	5.1	4.5	4.4	3.3	2.2	1.0	100.0	3.9	5.9	11.3	14.4	21.7	21.8	15.8	5.1	.1
Keratoiritis	.5	1.0	.7	.6	.5	.5	.3	.2	.1	100.0	10.4	5.9	9.6	11.1	17.1	21.5	17.0	7.4	.....
Sympathetic ophthalmitis	2.4	3.2	3.4	2.9	3.8	2.8	2.6	1.6	1.2	100.0	6.4	5.4	8.3	16.1	17.9	23.1	15.3	7.5	.....
Other affections of the iris and ciliary body, specified	(3)	.....	.....	.....	.....	(3)	(3)	.....	.....	(4)	.....	.....	.....	.....	(4)	(4)	.....	.....	.....
Affections of the iris and ciliary body, not specified	(3)	.1	.....	.....	.....	.1	(3)	.....	.....	(4)	(4)	.....	.....	.....	(4)	(4)	.....	.....	.....
Crystalline lens	24.6	16.5	14.2	11.8	9.8	13.9	20.1	32.6	49.7	100.0	3.2	2.2	3.3	4.0	8.6	17.1	29.8	31.7	.1
Cataract	24.4	15.6	13.8	11.5	9.6	13.6	19.9	32.5	49.4	100.0	3.0	2.2	3.3	4.0	8.5	17.1	30.1	31.8	(3)
Dislocated lens	.2	.9	.4	.3	.2	.3	.2	.1	.3	100.0	18.6	7.1	8.6	8.6	15.7	15.7	7.1	18.6	.....
Other affections of the lens, specified	(3)	.....	.....	.....	.....	.....	(3)	.....	.....	(4)	.....	.....	.....	.....	.....	(4)	.....	.....	.....
Affections of the lens, not specified	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Choroid and retina	12.4	11.9	13.0	13.3	14.5	13.4	12.2	12.0	10.3	100.0	4.6	4.0	7.5	11.8	16.5	20.7	21.8	13.1	[3]
Choroiditis	1.8	1.3	1.9	1.4	2.1	2.2	1.7	1.8	1.6	100.0	3.5	4.1	5.4	11.7	18.7	19.8	22.4	14.4	.....
Retinitis	1.6	1.3	1.1	1.3	1.1	1.5	1.9	1.6	1.7	100.0	3.8	2.8	5.7	7.0	14.2	26.1	23.4	17.0	.....
Chorioretinitis	3.5	4.5	4.1	3.8	4.3	4.2	3.5	3.2	2.5	100.0	6.1	4.4	7.5	12.1	18.1	20.6	20.2	10.9	.1
Detached retina	1.0	.6	1.7	1.4	1.2	1.0	.8	1.2	.3	100.0	3.1	6.8	10.2	12.5	16.6	18.3	28.1	4.4	.....
Retinal hemorrhage	.7	.1	.3	.2	.4	.5	.9	.9	.8	100.0	1.0	2.0	1.5	5.6	13.2	27.9	29.5	19.3	.....
Retinal degeneration	3.0	3.7	3.5	5.0	5.2	3.4	2.7	1.9	1.8	100.0	5.8	4.5	11.8	17.6	17.3	19.0	14.3	9.7	.....
Arteriosclerotic disease of choroid and retina	.5	.....	.....	.....	[3]	.3	.5	.8	1.3	100.0	.....	.....	.....	.6	8.1	19.2	34.2	37.9	.....
Other affections of the choroid and retina, specified	.2	.4	.4	.2	.2	.2	.1	.3	.2	100.0	8.4	7.0	4.2	9.9	11.3	12.7	32.4	14.1	.....
Affections of the choroid and retina, not specified	.1	.....	.....	[3]	[3]	.1	.1	.3	.1	[4]	.....	.....	[4]	[4]	[4]	[4]	[4]	[4]	.....
Optic nerve, visual pathways and centers	14.7	16.9	19.0	20.9	21.5	20.0	15.6	9.6	6.7	100.0	5.4	5.0	9.9	14.7	20.8	22.3	14.8	7.1	[3]
Optic nerve atrophy	12.8	12.5	16.3	18.8	19.3	17.5	13.8	8.5	5.8	100.0	4.6	4.9	10.2	15.1	20.8	22.4	14.9	7.1	[3]
Optic neuritis	.8	.6	.7	.9	1.0	1.2	.9	.4	.5	100.0	3.9	3.5	8.3	13.5	24.9	24.0	11.8	10.1	.....
Papilledema	.1	.....	.3	.3	.1	.1	.1	[3]	.1	[4]	.....	[4]	[4]	[4]	[4]	[4]	[4]	[4]	.....
Neuroretinitis	.3	1.1	.5	.3	.4	.3	.3	.3	.2	100.0	14.4	5.8	6.7	11.5	11.5	21.2	19.3	9.6	.....
Retrobulbar and intracranial lesions	.5	2.5	.6	.6	.5	.7	.4	.3	.1	100.0	22.3	4.5	7.6	10.2	20.4	18.5	12.7	3.8	.....
Other affections of the optic nerve, specified	.1	.1	.3	[3]	.1	.1	[3]	.1	.....	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]	.....	.....
Affections of the optic nerve, not specified	.1	.1	.3	.....	.1	.1	.1	[3]	.....	[4]	[4]	[4]	.....	[4]	[4]	[4]	[4]	.....	.....
Vitreous	.1	.1	.1	.1	.1	.1	.2	.2	.1	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]	.....
Miscellaneous and ill-defined	2.2	3.0	4.5	2.8	2.6	1.9	1.8	1.8	2.0	100.0	6.6	8.0	8.9	12.0	13.7	17.2	19.3	14.3	.....
Amblyopia, undefined	.6	1.5	2.2	1.4	.9	.5	.4	.1	.2	100.0	13.1	14.9	17.2	15.5	13.7	15.5	5.9	4.2	.....
Other miscellaneous and ill-defined lesions, specified	.3	.4	.3	.2	.3	.3	.3	.4	.4	100.0	5.9	4.0	5.0	8.9	14.9	15.8	26.7	18.8	.....
Lesions, not specified	1.3	1.1	2.0	1.2	1.4	1.1	1.1	1.3	1.4	100.0	3.9	6.0	6.3	11.3	13.4	18.4	23.1	17.6	.....

[1] Based on recipients of aid to the blind adjusted for underrepresentation for ages under 20 and 65 and over. See p. 129 for discussion of this adjustment.
[2] Cases of unknown age not distributed; less than 50 recipients.
[3] Less than 0.05 percent.
[4] Not computed; less than 50 recipients.

Table A–7.—*Site and type of affection by age at onset of blindness: Percentage distribution of recipients of aid to the blind, 20 States*

Site and type of affection	Site and type of affection for each age at onset of blindness											Age at onset of blindness for each site and type of affection										
	Under 1	1–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80 and over	Unknown	Total	Under 1	1–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80 and over	Unknown
Total number of recipients	2,118	1,603	1,510	1,751	2,303	2,911	3,399	2,370	1,093	279	1,254	20,591	2,118	1,603	1,510	1,751	2,303	2,911	3,399	2,370	1,093	279	1,254
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	10.3	7.8	7.3	8.5	11.2	14.1	16.5	11.5	5.3	1.4	6.1
Eyeball in general	30.8	21.0	21.1	20.3	19.2	22.3	23.8	24.8	19.0	12.9	23.5	100.0	13.9	7.2	6.8	7.6	9.4	13.8	17.3	12.5	4.4	.8	6.3
Glaucoma	.2	1.8	3.6	4.6	8.4	13.4	17.2	20.6	16.3	12.1	10.7	100.0	.2	1.3	2.5	3.7	8.9	18.0	26.9	22.5	8.2	1.6	6.2
Refractive errors	4.6	4.4	3.0	2.6	3.3	3.7	3.4	2.2	1.5	.....	6.4	100.0	13.8	10.0	6.4	6.5	10.9	15.4	16.1	7.2	2.4	.....	11.3
Panophthalmitis and acute endophthalmitis	1.9	3.5	2.4	2.4	1.3	1.0	.7	.6	.1	.....	.4	100.0	14.5	20.3	13.0	15.2	10.9	10.1	9.1	4.7	.4	.....	1.8
Structural anomalies	13.6	1.9	1.5	.8	.3	.5	.2	(1)	.....	.....	1.6	100.0	71.7	7.4	5.5	3.2	1.7	3.5	1.7	.3	.....	.....	5.0
Degenerative changes	8.3	7.5	7.0	7.1	4.3	2.6	1.3	.8	.7	.4	2.6	100.0	21.7	14.9	13.2	15.4	12.2	9.3	5.6	2.5	1.0	.1	4.1
Other affections of the eyeball, specified	.4	.4	.8	1.0	.6	.3	.3	.1	.....	.....	.2	100.0	10.5	7.0	14.0	20.9	17.4	11.6	12.8	2.3	.....	.....	3.5
Affections of the eyeball, not specified	1.8	1.5	2.8	1.8	1.0	.8	.7	.5	.4	.4	1.6	100.0	15.7	9.9	17.4	13.2	9.5	9.1	9.9	5.0	1.6	.4	8.3
Cornea	20.0	29.4	27.3	25.4	18.2	17.8	13.9	8.8	5.6	2.1	17.7	100.0	11.6	12.9	11.3	12.1	11.4	14.1	12.9	5.7	1.7	.2	6.1
Keratitis, interstitial	.9	2.5	3.1	2.5	1.0	.9	.4	.2	.1	.....	1.2	100.0	8.2	17.2	20.3	19.0	9.5	11.6	5.6	1.7	.4	.....	6.5
Keratitis, phlyctenular	.2	.3	.1	.1	(1)	.1	.1	(1)	.....	.....	.....	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	.....	.....	.....
Keratitis, ulcerative	12.6	11.9	8.6	6.6	4.8	5.3	4.7	2.7	1.6	.7	5.4	100.0	20.9	15.0	10.1	9.0	8.7	12.0	12.4	5.1	1.3	.2	5.3
Keratitis, not specified	2.1	2.1	2.7	1.9	1.7	1.7	1.2	.7	.6	.4	1.7	100.0	13.6	10.3	12.4	10.3	11.8	15.4	12.1	5.4	2.1	.3	6.3
Pannus	.4	3.5	4.2	4.6	3.8	2.7	2.5	1.3	1.4	.7	3.2	100.0	1.5	10.3	11.7	14.7	16.0	14.3	15.6	5.5	2.7	.4	7.3
Ulceration and vascularization	1.4	5.5	4.5	6.4	3.9	4.7	2.8	1.7	1.2	.....	2.8	100.0	4.1	12.4	9.6	15.7	12.6	19.3	13.6	5.8	1.8	.....	5.1
Other affections of the cornea, specified	1.3	1.8	2.7	2.3	1.9	1.4	1.4	1.4	.5	.3	1.7	100.0	8.5	8.5	12.5	12.2	13.1	12.1	14.9	9.7	1.8	.3	6.4
Affections of the cornea, not specified	1.1	1.8	1.4	1.0	1.1	1.0	.8	.8	.2	.....	1.7	100.0	11.3	13.1	9.9	8.5	12.2	13.1	12.7	8.4	.9	.....	9.9
Iris and ciliary body	2.2	11.1	13.5	13.6	10.6	8.4	6.5	4.7	2.3	.7	6.5	100.0	2.9	11.2	12.8	15.0	15.2	15.2	13.9	7.0	1.6	.1	5.1
Iritis	.1	.6	1.2	1.3	1.3	1.1	1.0	.5	.7	.....	1.4	100.0	1.6	4.9	10.3	12.4	15.7	17.3	17.8	6.5	4.3	.....	9.2
Iridocyclitis and uveitis	1.6	3.3	4.9	6.6	5.4	4.3	3.4	2.4	1.3	.4	3.4	100.0	4.5	7.0	9.8	15.2	16.6	16.6	15.2	7.4	1.9	.1	5.7
Keratoiritis	.3	.7	.5	1.3	.5	.5	.3	.4	.....	.....	.2	100.0	7.3	12.5	8.3	24.0	11.4	14.6	9.4	9.4	.....	.....	3.1
Sympathetic ophthalmitis	.1	6.5	6.8	4.4	3.4	2.4	1.8	1.4	.3	.3	1.4	100.0	.4	18.8	18.5	14.1	14.1	12.9	11.4	6.0	.5	.2	3.1
Other affections of the iris and ciliary body, specified	.1	.....	.....	.....	.....	.1	.....	(1)	.....	.....	.....	(2)	(2)	.....	.....	.....	.....	.....	(2)	.....	(2)	.....	.....	.....
Affections of the iris and ciliary body, not specified	.....	.....	.1	.....	.....	.....	(1)	.....	.....	.....	.1	(2)	.....	.....	(2)	.....	.....	.....	(2)	.....	.....	.....	(2)

Crystalline lens	22.4	8.2	6.5	6.7	9.4	12.4	23.8	36.7	52.1	69.2	17.8	100.0	11.7	3.2	2.4	2.9	5.3	8.9	19.9	21.4	14.0	4.8	5.5
Cataract	21.9	8.0	6.5	6.5	9.1	12.2	23.6	36.6	52.0	69.2	17.5	100.0	11.5	3.2	2.4	2.8	5.2	8.8	20.0	21.6	14.2	4.8	5.5
Dislocated lens	.5	.2	(1)	.2	.3	.2	.2	.1	.1	.....	.2	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	.....	(2)
Other affections of the lens, specified	.....	.....	.....	.....	.....	(1)	.....	.....	.....	.....	.1	(2)	.....	.....	.....	.....	.....	(2)	.....	.....	.....	.....	(2)
Affections of the lens, not specified	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Choroid and retina	9.6	11.7	13.9	13.3	15.8	12.6	12.1	12.5	11.9	10.4	16.3	100.0	7.7	7.1	8.0	8.9	13.8	13.9	15.6	11.2	4.9	1.1	7.8
Choroiditis	1.5	1.8	2.0	1.6	2.1	1.8	2.1	1.2	2.0	.3	2.6	100.0	8.5	7.9	8.2	7.4	13.0	13.5	19.0	7.7	5.8	.3	8.7
Retinitis	.5	.6	1.2	1.3	1.6	1.5	2.0	2.5	1.9	1.8	1.8	100.0	3.5	3.1	5.7	6.9	11.9	14.2	21.4	18.2	6.6	1.6	6.9
Chorioretinitis	3.0	3.7	4.2	3.9	5.1	3.7	3.5	2.8	3.0	2.9	4.7	100.0	8.3	7.9	8.3	9.0	15.3	14.2	15.5	8.5	4.3	1.0	7.7
Detached retina	.2	.5	1.3	1.8	2.0	1.2	1.0	1.2	.3	.....	.9	100.0	1.8	3.6	9.1	14.1	20.4	16.4	15.0	13.2	1.4	.....	5.0
Retinal hemorrhage	.....	.1	.3	.6	.3	.6	1.1	1.4	1.2	.3	.3	100.0	.....	1.6	3.2	7.9	4.7	13.4	29.1	26.0	10.2	.8	3.1
Retinal degeneration	4.3	4.7	4.7	3.9	4.5	2.9	1.8	2.0	1.1	2.9	5.2	100.0	13.1	10.9	10.3	10.0	15.0	12.4	9.0	6.8	1.8	1.2	9.5
Arteriosclerotic disease of choroid and retina	.....	.1	.1	.....	.....	.5	.4	.9	1.6	2.2	.4	100.0	.....	1.2	1.2	.....	.....	15.9	19.5	26.8	22.0	7.3	6.1
Other affections of the choroid and retina, specified	.1	.1	.1	.2	.1	.4	.1	.4	.5	.....	.2	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	.....	(2)
Affections of the choroid and retina, not specified	(1)	.1	.....	.....	.1	(1)	.1	.1	.3	.....	.2	(2)	(2)	(2)	.....	.....	(2)	(2)	(2)	(2)	(2)	.....	(2)
Optic nerve, visual pathways and centers	10.1	15.9	15.5	18.4	24.7	24.6	18.0	10.9	7.5	3.6	15.0	100.0	6.1	7.4	6.8	9.3	16.4	20.7	17.7	7.5	2.4	.3	5.4
Optic nerve atrophy	8.8	13.5	13.5	16.4	22.2	22.2	15.6	9.5	6.3	3.2	13.9	100.0	6.1	7.1	6.7	9.4	16.7	21.2	17.3	7.3	2.2	.3	5.7
Optic neuritis	.3	1.5	1.1	.9	1.0	1.0	1.0	.8	.6	.4	.2	100.0	3.3	13.2	9.3	8.8	13.2	15.9	19.8	10.4	3.8	.6	1.7
Papilledema	.1	.1	.2	.2	.1	.1	.1	(1)	.1	.....	.....	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	.....	.....
Neuroretinitis	.2	.4	.3	.1	.4	.4	.5	.2	.1	.....	.5	100.0	7.4	10.3	7.3	4.4	14.7	16.2	23.5	5.9	1.5	.....	8.8
Retrobulbar and intracranial lesions	.3	.3	.3	.6	.8	.8	.7	.3	.3	.....	.4	100.0	5.8	3.9	3.9	9.7	17.5	22.3	22.3	6.8	2.9	.....	4.9
Other affections of the optic nerve, specified	.2	.....	.1	.1	.1	(1)	.....	.1	.....	.....	.....	(2)	(2)	.....	(2)	(2)	(2)	(2)	.....	(2)	.....	.....	.....
Affections of the optic nerve, not specified	.2	.1	.....	.1	.1	.1	.1	.....	.1	.....	.....	(2)	(2)	(2)	.....	(2)	(2)	(2)	(2)	.....	(2)	.....	.....
Vitreous	.1	.1	.1	.2	.1	.1	.1	.3	.1	.....	.2	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	.....	(2)
Miscellaneous and ill-defined	4.8	2.6	2.1	2.1	2.0	1.8	1.8	1.3	1.5	1.1	3.0	100.0	22.2	9.1	7.0	8.1	10.2	11.5	13.1	6.5	3.5	.7	8.1
Amblyopia, undefined	2.8	.9	.4	.3	.3	.4	.2	.3	.3	.....	1.0	100.0	44.4	10.5	5.3	3.7	6.0	8.3	5.3	5.3	2.2	.....	9.0
Other miscellaneous and ill-defined lesions, specified	.4	.1	.1	.3	.3	.3	.5	.2	.3	.4	.5	100.0	12.5	3.1	1.6	9.4	10.9	14.1	26.6	6.2	4.7	1.5	9.4
Lesions, not specified	1.6	1.6	1.6	1.5	1.4	1.1	1.1	.8	.9	.7	1.5	100.0	13.4	9.9	9.2	9.9	12.2	12.6	13.7	7.3	3.8	.8	7.2

[1] Less than 0.05 percent.

[2] Not computed; less than 50 recipients.

Table A–8.—*Number and percentage distribution of recipients of aid to the blind by etiology and by site or site and type of affection for each etiology, 20 States* [1]

Etiology and site and type of affection	Number of recipients	Percentage distribution by—		
		Etiology		Site or site and type of affection for each etiology
		Unadjusted for age	Adjusted for age	
TOTAL	20,591	100.0	100.0	
INFECTIOUS DISEASES	*5,059*	*24.6*	*21.4*	
Diphtheria	*2*	(2)	(2)	
Gonorrhea, n. e. c [3]	*74*	*.4*	*.3*	*100.0*
Eyeball in general	19			25.7
Cornea	52			70.3
Other	3			4.0
Measles	*111*	*.5*	*.5*	*100.0*
Eyeball in general	16			14.4
Cornea	38			34.3
Choroid and retina	21			18.9
Optic nerve, pathways, centers	18			16.2
Other	18			16.2
Meningitis	*132*	*.6*	*.5*	*100.0*
Eyeball in general	32			24.2
Optic nerve, pathways, centers	76			57.6
Other	24			18.2
Ophthalmia neonatorum	*429*	*2.1*	*2.0*	*100.0*
Eyeball in general	125			29.1
Panophthalmitis and acute endophthalmitis	22			5.1
Degenerative changes	95			22.1
Other	8			1.9
Cornea	286			66.7
Keratitis, ulcerative	227			52.9
Other	59			13.8
Other	18			4.2
Scarlet fever	*50*	*.2*	*.2*	
Septicemia	*299*	*1.5*	*1.4*	*100.0*
Eyeball in general	38			12.7
Cornea	41			13.7
Iris and ciliary body	78			26.1
Crystalline lens	11			3.7
Choroid and retina	61			20.4
Optic nerve, pathways, centers	68			22.7
Miscellaneous and ill-defined	2			.7
Smallpox	*36*	*.2*	*.1*	*100.0*
Cornea	23			63.9
Other	13			36.1
Syphilis	*1,689*	*7.7*	*6.1*	*100.0*
Eyeball in general	32			2.0
Cornea	193			12.2
Keratitis, interstitial	143			9.0
Keratitis, ulcerative	18			1.1
Keratitis, not specified	23			1.5
Other	9			.6
Iris and ciliary body	143			9.0
Iritis	30			1.9
Iridocyclitis and uveitis	98			6.2
Keratoiritis	15			.9
Crystalline lens	15			1.0
Choroid and retina	204			12.8
Choroiditis	40			2.5
Retinitis	15			.9
Chorioretinitis	127			8.0
Retinal degeneration	11			.7
Other	11			.7
Optic nerve, pathways, centers	984			61.9
Optic nerve atrophy	927			58.3
Optic neuritis	33			2.1
Other	24			1.5
Other	18			1.1

See footnotes at end of table.

Table A–8.—*Number and percentage distribution of recipients of aid to the blind by etiology and by site or site and type of affection for each etiology, 20 States* [1]—Continued

Etiology and site and type of affection	Number of recipients		Percentage distribution by— Etiology: Unadjusted for age	Etiology: Adjusted for age	Site or site and type of affection for each etiology	
Trachoma	*1,561*		*7.5*	*6.8*	*100.0*	
Eyeball in general	40				2.6	
Cornea	1,500				96.7	
Keratitis, ulcerative		265				17.1
Keratitis, not specified		32				2.1
Pannus		529				34.1
Ulceration and vascularization		599				38.6
Other		75				4.8
Other	11				.7	
Tuberculosis	*80*		*.4*	*.3*	*100.0*	
Eyeball in general	4				5.0	
Cornea	25				31.2	
Iris and ciliary body	36				45.0	
Choroid and retina	15				18.8	
Typhoid fever	*49*		*.2*	*.2*	*100.0*	
Cornea	14				28.6	
Optic nerve, pathways, centers	15				30.6	
Other	20				40.8	
Multiple infectious diseases	*11*		*.1*	*.1*	.....	
Other infectious diseases, specified	*115*		*.6*	*.5*	*100.0*	
Eyeball in general	21				18.3	
Cornea	34				29.5	
Optic nerve, pathways, centers	39				33.9	
Other	21				18.3	
Infectious diseases, not specified	*531*		*2.6*	*2.4*	*100.0*	
Eyeball in general	66				12.4	
Cornea	169				31.8	
Keratitis, ulcerative		104				19.6
Other		65				12.2
Iris and ciliary body	141				26.6	
Iridocyclitis and uveitis		114				21.5
Other		27				5.1
Choroid and retina	97				18.3	
Optic nerve, pathways, centers	47				8.8	
Other	11				2.1	
TRAUMA	*2,079*		*10.1*	*8.9*	*100.0*	
Eyeball in general	562				27.0	
Panophthalmitis and acute endophthalmitis		95				4.5
Degenerative changes		297				14.3
Other		170				8.2
Cornea	344				16.5	
Keratitis, ulcerative		144				6.9
Keratitis, not specified		40				1.9
Other		160				7.7
Iris and ciliary body	615				29.6	
Sympathetic ophthalmitis		521				25.0
Other		94				4.6
Crystalline lens	176				8.5	
Cataract		162				7.8
Other		14				.7
Choroid and retina	147				7.1	
Detached retina		69				3.3
Other		78				3.8
Optic nerve, pathways, centers	167				8.0	
Optic nerve atrophy		136				6.5
Other		31				1.5
Vitreous	5				.3	
Miscellaneous and ill-defined	63				3.0	

See footnotes at end of table.

Table A–8.—*Number and percentage distribution of recipients of aid to the blind by etiology and by site or site and type of affection for each etiology, 20 States* [1]—Continued

Etiology and site and type of affection	Number of recipients	Percentage distribution by—		
		Etiology		Site or site and type of affection for each etiology
		Unadjusted for age	Adjusted for age	
POISONINGS	*101*	*0.5*	*0.4*	*100.0*
Optic nerve, pathways, centers	82			81.2
Optic nerve atrophy	66			65.4
Other	16			15.8
Other	19			18.8
NEOPLASMS	*135*	*.6*	*.6*	*100.0*
Eyeball in general	9			6.7
Cornea	29			21.5
Optic nerve, pathways, centers	86			63.7
Optic nerve atrophy	65			48.1
Other	21			15.6
Other	11			8.1
GENERAL DISEASES, N. E. C.	*994*	*4.8*	*5.1*	
Anemia and other blood diseases	*8*	(2)	(2)	
Diabetes	*303*	*1.5*	*1.4*	*100.0*
Crystalline lens	105			34.7
Cataract	105			34.7
Choroid and retina	173			57.1
Retinitis	103			34.0
Other	70			23.1
Other	25			8.2
Nephritis and other kidney diseases	*65*	*.3*	*.4*	*100.0*
Choroid and retina	49			75.4
Other	16			24.6
Vascular diseases	*345*	*1.7*	*2.1*	*100.0*
Choroid and retina	201			58.2
Chorioretinitis	32			9.3
Retinal hemorrhage	28			8.1
Retinal degeneration	28			8.1
Arteriosclerotic disease of choroid and retina	72			20.8
Other	41			11.9
Optic nerve, pathways, centers	99			28.7
Optic nerve atrophy	85			24.6
Other	14			4.1
Other	45			13.1
Diseases of the central nervous system	*122*	*.6*	*.5*	*100.0*
Optic nerve, pathways, centers	92			75.4
Optic nerve atrophy	75			61.5
Other	17			13.9
Other	30			24.6
Diseases of pregnancy and childbirth	*20*	*.1*	*.1*	
Nutritional deficiency	*12*	(2)	*.1*	
Other general diseases, specified	*75*	*.4*	*.3*	
General diseases, not specified	*44*	*.2*	*.2*	
PRENATAL ORIGIN, N. E. C.	*1,956*	*9.5*	*9.4*	*100.0*
Eyeball in general	668			34.2
Glaucoma	14			.7
Refractive errors	214			11.0
Structural anomalies	386			19.7
Other	54			2.8
Cornea	29			1.5
Crystalline lens	606			31.0
Cataract	591			30.2
Dislocated lens	15			.8
Choroid and retina	378			19.3
Retinal degeneration	278			14.2
Other	100			5.1
Optic nerve, pathways, centers	173			8.8
Optic nerve atrophy	153			7.8
Other	20			1.0
Other	102			5.2

See footnotes at end of table.

Table A–8.—*Number and percentage distribution of recipients of aid to the blind by etiology and by site or site and type of affection for each etiology, 20 States* [1]—Continued

Etiology and site and type of affection	Number of recipients	Percentage distribution by—		
		Etiology		Site or site and type of affection for each etiology
		Unadjusted for age	Adjusted for age	
UNKNOWN TO SCIENCE	*5,875*	*28.6*	*34.2*	*100.0*
Eyeball in general	2,556			43.5
Glaucoma	2,061			35.1
Refractive errors	475			8.1
Other	20			.3
Cornea	57			1.0
Iris and ciliary body	18			.3
Crystalline lens	2,844			48.4
Cataract	2,840			8.3
Other	4			.1
Choroid and retina	347			5.9
Retinal degeneration	279			4.7
Other	68			1.2
Optic nerve, pathways, centers	40			.7
Miscellaneous and ill-defined	13			.2
UNDETERMINED BY PHYSICIAN OR NOT SPECIFIED	*4,392*	*21.3*	*20.0*	*100.0*
Eyeball in general	435			9.9
Glaucoma	51			1.2
Refractive errors	15			.3
Panophthalmitis and acute endophthalmitis	58			1.3
Structural anomalies	13			.3
Degenerative changes	215			4.9
Other, specified	4			.1
Other, not specified	79			1.8
Cornea	757			17.2
Keratitis, interstitial	72			1.6
Keratitis, ulcerative	338			7.7
Keratitis, not specified	170			3.9
Other, specified	93			2.1
Other, not specified	84			1.9
Iris and ciliary body	469			10.7
Iritis	94			2.2
Iridocyclitis and uveitis	337			7.7
Keratoiritis	23			.5
Sympathetic ophthalmitis	14			.3
Other, not specified	1			(2)
Crystalline lens	254			5.8
Cataract	242			5.5
Dislocated lens	12			.3
Choroid and retina	862			19.6
Choroiditis	217			4.9
Retinitis	85			1.9
Chorioretinitis	355			8.1
Detached retina	97			2.2
Retinal hemorrhage	31			.7
Retinal degeneration	57			1.3
Other	20			.5
Optic nerve, pathways, centers	1,408			32.1
Optic nerve atrophy	1,270			28.9
Optic neuritis	66			1.5
Neuroretinitis	35			.8
Retrobulbar and intracranial lesions	25			.6
Other	12			.3
Vitreous	13			.3
Miscellaneous and ill-defined	194			4.4
Amblyopia, undefined	40			.9
Other, specified	33			.7
Other, not specified	121			2.8

[1] Figures in this table are unadjusted for underrepresentation for ages under 20 and 65 and over, except for percentage distribution by etiology.
[2] Less than 0.05 percent.
[3] Not elsewhere classified.

Table A–9.—*Etiology by State: Percentage distribution of recipients of aid to the blind, 20 States*

Etiology	Total	Ind.	Okla.	Wis.	Tenn.	Iowa	Kans.	Mass.	La.	Ark.	Wash.	Va.	W. Va.	S. C.	N. J.	Md.	N. H.	S. Dak.	N. Dak.	Conn.	R. I.
Total number of recipients	20,591	2,413	2,141	2,014	1,526	1,478	1,388	1,176	1,165	1,103	1,053	1,030	833	800	757	666	297	265	231	189	66
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Infectious diseases	24.6	37.5	30.9	11.1	18.7	18.8	24.3	32.0	29.7	39.2	10.5	14.8	31.1	20.1	15.6	22.2	15.2	47.2	14.7	23.3	27.3
Diphtheria	(1)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.1	.....	.....	.....	.....	.....	.....	.4	.....	.....
Gonorrhea, not elsewhere classified	.4	.3	.3	.1	.3	.....	.5	.....	1.6	.4	.....	.....	.1	1.9	.1	.6	.....	.....	.....	.5	.....
Measles	.5	.7	.6	.6	.7	1.2	.4	.1	.2	.4	.....	.1	1.2	.6	.5	.....	1.0	1.1	.....	.5	.....
Meningitis	.6	.8	.9	.1	1.1	.9	.9	.6	.6	.6	.3	.8	.7	.4	.....	.2	.7	.7	.....	2.1	.....
Ophthalmia neonatorum	2.1	2.4	1.9	1.0	1.8	2.2	1.3	4.3	2.8	1.7	.4	.7	4.3	3.6	1.1	3.3	3.0	1.9	.9	1.1	7.6
Scarlet fever	.2	.4	.1	.4	.2	.7	.1	.3	.1	.....	.4	.1	.4	.....	.1	.2	.4	.....	.....	1.1	.....
Septicemia	1.5	2.8	.1	.4	.....	.2	1.7	.4	5.4	8.0	.3	.....	.7	1.8	.4	1.2	.7	.....	.....	.....	.....
Smallpox	.2	.2	.1	.3	.1	.2	.1	.....	.4	.2	.2	.....	.3	.1	.....	.....	.....	.4	.....	.....	.....
Syphilis	7.7	8.9	3.0	2.3	6.2	5.4	7.4	10.9	14.9	11.0	4.5	8.0	12.6	10.8	11.5	15.0	4.4	3.8	1.3	12.7	13.6
Trachoma	7.5	11.4	23.3	1.7	5.4	6.3	8.6	1.2	1.1	15.9	3.7	1.2	8.7	.....	.5	.5	.3	35.1	9.1	.5	.....
Tuberculosis	.4	.6	.....	.2	.6	.1	.3	1.0	.6	.2	.3	.3	.5	.1	.1	.4	1.7	.4	.9	1.1	.....
Typhoid fever	.2	.1	.3	.2	.6	.1	.1	.....	1.1	.4	.1	.....	.2	.1	.3	.1	.3	.4	.....	.....	.....
Multiple infectious diseases	.1	.....	.1	.3	.....	.....	.1	.....	.2	.....	.....	.....	.....	.1	.....	.....	.....	.....	.....	.....	.....
Other infectious diseases, specified	.6	.....	.2	.9	1.0	.8	.5	.4	.4	.1	.2	.3	.7	.6	.3	.1	.7	1.1	.8	.5	.....
Infectious diseases, not specified	2.6	8.0	.....	2.6	.7	.7	2.3	12.8	.3	.3	.1	3.2	.7	.1	.7	.6	2.0	2.3	1.3	3.2	6.1
Trauma	10.1	7.2	8.1	9.6	11.9	13.2	8.8	5.2	10.7	14.8	8.4	10.7	18.0	13.8	7.5	8.0	12.5	12.1	11.3	10.6	9.1
Poisonings	.5	.6	.1	.3	.5	.3	.7	1.1	.3	.5	.7	.2	1.1	.1	.4	.3	1.3	.4	.4	1.0	1.5
Neoplasms	.6	.4	.9	.8	.6	.9	1.1	1.5	.6	.1	.2	.3	.4	.....	.3	1.2	.3	.4	.4	1.0	3.0
General diseases, not elsewhere classified	4.8	6.1	2.0	7.3	2.8	6.5	7.1	7.9	4.1	4.0	5.3	2.1	3.1	2.1	4.1	4.0	7.1	2.2	5.6	6.9	6.1
Anemia and other blood diseases	(1)	.....	.1	.1	.....	(1)	.1	.....	.....	.....	.1	.....	.....	.1	.....	.....	.4	.....	.....	.5	.....
Diabetes	1.5	1.8	.2	2.2	.3	2.5	2.3	3.8	1.2	.....	1.5	.5	1.1	.6	1.7	1.4	1.7	1.1	3.0	1.6	3.1
Nephritis and other kidney diseases	.3	.9	.1	.4	.3	.3	.3	.1	.7	.3	.4	.....	.....	.4	.....	.....	.7	.....	.....	.....	.....
Vascular diseases	1.7	2.1	.6	2.0	.9	1.5	3.0	3.4	1.0	3.3	1.8	.9	.7	.5	1.6	1.5	2.0	.7	1.3	3.2	.....
Diseases of the central nervous system	.6	.7	1.0	1.4	.2	.5	.5	.2	.4	.3	.6	.3	.4	.3	.3	.4	.3	.4	.9	1.1	.....
Diseases of pregnancy and childbirth	.1	.2	.....	.1	.....	.2	.2	.1	.1	.....	.1	.2	.3	.....	.1	.....	.....	.....	.....	.....	.....
Nutritional deficiency	(1)	.....	.....	.....	.1	.....	.....	.2	.4	.1	.....	.1	.....	.....	.....	.....	.....	.....	.4	.....	3.0
Other general diseases, specified	.4	.2	(1)	.5	.9	1.0	.4	.1	.3	.....	.6	.....	.5	.1	.4	.4	.....	.....	.....	.....	.....
General diseases, not specified	.2	.2	(1)	.6	.1	.5	.3	.....	.....	.....	.2	.1	.1	.1	.....	.3	2.0	.....	.....	.5	.....
Prenatal origin, not elsewhere classified	9.5	12.9	6.1	9.2	8.4	11.2	7.6	12.9	10.6	7.2	6.7	5.1	13.1	11.4	9.2	8.1	10.1	9.4	11.3	17.5	18.2
Hereditary origin, established	.8	1.0	.1	2.5	1.1	1.4	.4	.4	.....	.7	.....	.....	2.4	.....	1.0	.1	.3	.....	.9	1.1	.....
Hereditary origin, presumed	2.6	.8	.....	1.2	3.2	2.1	1.5	12.0	6.5	2.3	.5	1.3	4.0	.8	7.0	.3	2.0	2.2	3.9	2.1	18.2
Prenatal origin, cause not specified	6.1	11.1	6.0	5.5	4.1	7.7	5.7	.5	4.1	4.2	6.2	3.8	6.7	10.6	1.2	7.7	7.8	7.2	6.5	14.3	.....
Unknown to science	28.6	26.9	24.5	35.7	17.7	25.8	40.3	29.6	26.5	27.6	37.3	33.2	19.4	20.5	29.1	31.8	36.7	17.0	44.2	27.5	16.7
Undetermined by physician or not spec.	21.3	8.4	27.4	26.0	39.4	23.3	10.1	9.8	17.5	6.6	30.9	33.6	13.8	32.0	33.8	24.4	16.8	11.3	12.1	12.2	18.1

[1] Less than 0.05 percent.

Table A–10.—*Etiology by race: Percentage distribution of recipients of aid to the blind, 20 States*

Etiology	Etiology for each race			Race for each etiology			
	White[1]	Negro	Unknown	Total	White[1]	Negro	Unknown
Total number of recipients	16,358	4,177	56	20,591	16,358	4,177	56
Total percent	100.0	100.0	100.0	100.0	79.4	20.3	0.3
Infectious diseases	24.0	27.0	8.9	100.0	77.6	22.3	.1
Diphtheria	(2)	(2)	.....	(3)	(3)	(3)	.....
Gonorrhea, not elsewhere classified	.2	.9	.....	100.0	51.4	48.6	.....
Measles	.6	.4	.....	100.0	85.6	14.4	.....
Meningitis	.7	.4	.....	100.0	88.6	11.4	.....
Ophthalmia neonatorum	2.1	2.0	.....	100.0	80.4	19.6	.....
Scarlet fever	.3	(2)	1.8	100.0	96.0	2.0	2.0
Septicemia	1.3	2.1	.....	100.0	70.2	29.8	.....
Smallpox	.1	.3	.....	(3)	(3)	(3)	.....
Syphilis	5.1	18.1	1.8	100.0	52.3	47.6	.1
Trachoma	9.4	.3	5.3	100.0	99.0	.8	.2
Tuberculosis	.4	.4	.....	100.0	77.5	22.5	.....
Typhoid fever	.2	.2	.....	(3)	(3)	(3)	.....
Multiple infectious diseases	.1	.1	.....	(3)	(3)	(3)	.....
Other infectious diseases, specified	.6	.3	.....	100.0	88.6	11.4	.....
Infectious diseases, not specified	2.9	1.5	.....	100.0	88.1	11.9	.....
Trauma	10.0	10.7	7.1	100.0	78.3	21.5	.2
Poisonings	.5	.4	.....	100.0	84.2	15.8	.....
Neoplasms	.7	.3	.....	100.0	89.6	10.4	.....
General diseases, not elsewhere classified	5.4	2.6	5.4	100.0	88.6	11.1	.3
Anemia and other blood diseases	(2)	(2)	.....	(3)	(3)	(3)	.....
Diabetes	1.7	.7	.....	100.0	90.8	9.2	.....
Nephritis and other kidney diseases	.3	.2	.....	100.0	84.6	15.4	.....
Vascular diseases	1.8	1.1	3.6	100.0	86.1	13.3	.6
Diseases of the central nervous system	.7	.1	.....	100.0	95.1	4.9	.....
Diseases of pregnancy and childbirth	.1	.1	.....	(3)	(3)	(3)	.....
Nutritional deficiency	.1	.1	.....	(3)	(3)	(3)	.....
Other general diseases, specified	.4	.2	1.8	100.0	86.7	12.0	1.3
General diseases, not specified	.3	.1	.....	(3)	(3)	(3)	.....
Prenatal origin, not elsewhere classified	10.9	4.2	3.6	100.0	90.9	9.0	.1
Hereditary origin, established	1.0	.1	.....	100.0	97.6	2.4	.....
Hereditary origin, presumed	2.9	1.3	1.8	100.0	89.4	10.4	.2
Prenatal origin, cause not specified	7.0	2.8	1.8	100.0	90.6	9.3	.1
Unknown to science	28.6	28.0	41.1	100.0	79.7	19.9	.4
Undetermined by physician or not specified	19.9	26.8	33.9	100.0	74.1	25.5	.4

[1] Includes all races other than Negro and unknown.
[2] Less than 0.05 percent.
[3] Not computed; less than 50 recipients.

Table A–11.—*Etiology by age: Adjusted percentage distribution of recipients of aid to the blind,*[1] *20 States*

Etiology	Etiology for each age group [2]									Age group for each etiology									
	Total	Under 20	20–29	30–39	40–49	50–59	60–69	70–79	80 and over	Total	Under 20	20–29	30–39	40–49	50–59	60–69	70–79	80 and over	Unknown
Total adjusted number of recipients	30,035	1,423	1,162	2,085	3,020	4,582	6,281	6,765	4,703	30,035	1,423	1,162	2,085	3,020	4,582	6,281	6,765	4,703	14
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	4.7	3.9	6.9	10.1	15.3	20.9	22.5	15.7	(3)
Infectious diseases	21.4	23.9	25.5	32.1	32.1	29.0	22.8	15.2	7.8	100.0	5.3	4.6	10.4	15.1	20.6	22.2	16.0	5.7	0.1
Diphtheria	(3)	.....	.....	.....	(3)	.....	(3)	.....	.....	(4)	.....	.....	.....	(4)	.....	(4)	.....	.....	.....
Gonorrhea, not elsewhere classified	.3	.3	.3	1.0	.8	.4	.1	(3)	.1	100.0	4.8	4.8	24.1	27.7	19.3	9.7	2.4	7.2	.....
Measles	.5	.8	1.0	.8	.6	.5	.5	.4	.1	100.0	8.4	8.4	11.9	13.3	16.8	21.6	17.5	2.1	.....
Meningitis	.5	1.8	1.5	1.6	.8	.7	.4	.1	.....	100.0	16.0	11.1	21.0	14.2	20.4	14.2	3.1	.....	.....
Ophthalmia neonatorum	2.0	11.0	5.0	5.9	3.6	1.8	.8	.4	.1	100.0	26.0	9.6	20.3	18.0	13.7	7.8	4.1	.5	.....
Scarlet fever	.2	.3	.1	.3	.4	.4	.2	.1	.1	100.0	6.2	1.5	9.3	16.9	24.6	16.9	15.4	9.2	.....
Septicemia	1.4	.5	.6	1.5	1.4	1.7	1.6	1.5	.9	100.0	1.7	1.7	7.6	10.5	18.5	24.6	25.1	10.3	.....
Smallpox	.1	.1	.1	.1	.1	.2	.2	.2	.....	100.0	2.0	2.0	6.0	4.0	20.0	30.0	36.0	.....	.....
Syphilis	6.1	5.0	8.7	11.0	12.9	10.1	5.8	2.9	.3	100.0	4.0	5.5	12.6	21.3	25.4	19.8	10.7	.7	.....
Trachoma	6.8	.6	2.8	5.1	7.7	9.3	9.3	6.5	4.6	100.0	.4	1.6	5.2	11.3	20.9	28.5	21.4	10.6	.1
Tuberculosis	.3	.3	1.0	.8	.4	.4	.3	.2	.....	100.0	4.1	11.3	17.5	12.4	16.5	19.6	18.6	.....	.....
Typhoid fever	.2	.....	.3	.4	.4	.2	.2	.1	.....	100.0	.....	7.6	15.1	24.5	15.1	28.3	9.4	.....	.....
Multiple infectious diseases	.1	.3	.2	.....	.1	(3)	.1	.....	.....	(4)	(4)	(4)	.....	(4)	(4)	(4)	.....	.....	.....
Other infectious diseases, specified	.5	.5	1.5	.7	.4	.5	.5	.4	.4	100.0	4.6	11.9	9.9	9.3	15.2	21.9	16.6	10.6	.....
Infectious diseases, not specified	2.4	2.4	2.4	2.9	2.5	2.8	2.8	2.4	1.2	100.0	4.7	3.9	8.3	10.7	17.8	24.2	22.1	8.0	.3
Trauma	8.9	7.9	12.0	13.2	12.3	11.0	9.8	7.0	4.1	100.0	4.2	5.2	10.3	13.8	18.7	22.9	17.7	7.2	.....
Poisonings	.4	.1	.2	.9	.6	.5	.6	.3	.1	100.0	.8	1.6	14.9	14.9	19.0	29.8	14.0	5.0	.....
Neoplasms	.6	2.9	2.1	1.1	.7	.7	.4	.2	.2	100.0	21.4	12.5	11.4	10.4	17.2	14.1	7.8	5.2	.....
General diseases, not elsewhere classified	5.1	1.4	3.9	2.8	2.7	4.3	6.1	6.2	6.7	100.0	1.4	3.0	3.9	5.4	13.0	25.2	27.5	20.6	.....
Anemia and other blood diseases	(3)	.1	.....	.....	.....	.....	.1	(3)	.1	(4)	(4)	.....	.....	.....	.....	(4)	(4)	(4)	.....
Diabetes	1.4	.....	.2	.7	.8	1.8	2.3	1.6	.8	100.0	.....	.5	3.1	5.8	20.2	34.5	26.5	9.4	.....
Nephritis and other kidney diseases	.4	.1	.2	.2	.1	.2	.4	.5	.5	100.0	.9	1.9	3.7	4.7	8.4	25.2	30.9	24.3	.....
Vascular diseases	2.1	.1	.4	.1	.5	1.2	2.2	3.3	4.4	100.0	.2	.8	.5	2.2	8.3	21.3	34.6	32.1	.....
Diseases of the central nervous system	.5	.7	2.2	1.2	.7	.4	.4	.2	.1	100.0	7.7	18.1	17.5	14.7	14.0	15.4	10.5	2.1	.....
Diseases of pregnancy and childbirth	.1	.....	.2	.1	.1	.1	.1	.1	.....	(4)	.....	(4)	(4)	(4)	(4)	(4)	(4)	.....	.....
Nutritional deficiency	.1	.2	.....	.1	.1	.1	(3)	.....	.....	(4)	(4)	.....	(4)	(4)	(4)	(4)	.....	.....	.....
Other general diseases, specified	.3	.2	.3	.3	.2	.4	.4	.3	.4	100.0	2.9	3.9	6.9	7.8	16.7	25.5	17.7	18.6	.....
General diseases, not specified	.2	(3)	.4	.1	.2	.1	.2	.2	.4	100.0	1.4	7.3	2.9	8.7	7.3	23.2	21.7	27.5	.....

Prenatal origin, not elsewhere classified	9.4	51.7	30.6	21.3	13.6	8.0	5.0	2.2	1.0	100.0	26.1	12.6	15.7	14.5	13.0	11.2	5.2	1.7	[3]
Hereditary origin, established	.7	.9	2.9	2.0	1.0	.5	.5	.2	.2	100.0	6.6	16.7	21.2	14.6	11.6	16.7	7.6	5.0	.....
Hereditary origin, presumed	2.5	12.5	6.6	5.7	4.6	2.4	1.3	.5	.2	100.0	23.8	10.3	15.8	18.4	14.9	11.2	4.4	1.2	.....
Prenatal origin, cause not specified	6.2	38.3	21.1	13.6	8.0	5.1	3.2	1.5	.6	100.0	29.1	13.1	15.1	13.0	12.4	10.6	5.2	1.5	[3]
Unknown to science	34.2	2.0	6.5	8.7	14.4	22.7	33.8	50.2	63.5	100.0	.3	.7	1.8	4.2	10.1	20.7	33.0	29.1	.1
Undetermined by physician or not specified	20.0	10.1	19.2	19.9	23.6	23.8	21.5	18.7	16.6	100.0	2.4	3.7	6.9	11.9	18.2	22.6	21.2	13.0	.1

[1] Based on recipients of aid to the blind adjusted for underrepresentation for ages under 20 and 65 and over. See p. 129 for discussion of this adjustment.
[2] Cases of unknown age not distributed; less than 50 recipients.
[3] Less than 0.05 percent.
[4] Not computed; less than 50 recipients

Table A–12.—*Etiology by age at onset of blindness: Percentage distribution of recipients of aid to the blind, 20 States*

Etiology	Etiology for each age at onset of blindness											Age at onset of blindness for each etiology										
	Under 1	1–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80 and over	Unknown	Total	Under 1	1–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80 and over	Unknown
Total number of recipients	2,118	1,603	1,510	1,751	2,303	2,911	3,399	2,370	1,093	279	1,254	20,591	2,118	1,603	1,510	1,751	2,303	2,911	3,399	2,370	1,093	279	1,254
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	10.3	7.8	7.3	8.5	11.2	14.1	16.5	11.5	5.3	1.4	6.1
Infectious diseases	25.9	39.9	31.3	32.8	31.4	28.5	19.9	12.2	7.1	2.1	17.5	100.0	10.9	12.6	9.4	11.4	14.3	16.4	13.4	5.7	1.5	.1	4.3
Diphtheria	.....	.....	.1	.....	(1)	.....	.....	.....	.....	.....	.....	(2)	.....	.....	(2)	.....	(2)	.....	.....	.....	.....	.....	.....
Gonorrhea, not elsewhere classified	.3	.8	1.6	.8	.2	.1	.2	(1)	.....	.....	.2	100.0	9.5	17.6	32.4	18.9	5.4	5.4	6.8	1.3	.....	.....	2.7
Measles	.3	2.8	1.4	.6	.3	.2	.2	.2	.....	.4	.2	100.0	6.3	40.6	19.8	9.9	6.3	5.4	4.5	3.6	.....	.9	2.7
Meningitis	.9	3.8	1.7	.4	.4	.1	(1)	(1)	.....	.....	.3	100.0	14.4	46.2	19.7	5.3	6.8	3.0	.8	.8	.....	.....	3.0
Ophthalmia neonatorum	17.3	2.0	.5	.2	.1	.2	(1)	.1	.....	.....	.6	100.0	85.5	7.5	1.6	.9	.5	1.2	.2	.7	.....	.....	1.9
Scarlet fever	.1	2.0	.3	.....	.2	.....	.2	.....	.....	.....	.....	100.0	6.0	64.0	10.0	.....	10.0	.....	10.0	.....	.....	.....	.....
Septicemia	.1	1.2	1.4	2.4	1.6	2.0	1.7	1.8	1.3	.3	.5	100.0	.3	6.4	7.0	14.4	12.0	19.1	19.7	14.1	4.7	.3	2.0
Smallpox	.1	.7	.4	.2	(1)	.1	.1	.1	.....	.....	.2	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	.....	.....	(2)
Syphilis	2.6	5.7	7.0	10.8	15.1	13.2	7.5	3.6	.8	.....	5.4	100.0	3.5	5.7	6.7	11.9	21.9	24.1	16.0	5.3	.6	.....	4.3
Trachoma	.9	11.8	11.5	13.0	9.7	9.0	6.7	3.9	3.5	1.1	7.7	100.0	1.3	12.2	11.2	14.6	14.4	16.8	14.8	5.9	2.4	.2	6.2
Tuberculosis	.....	.9	.9	.7	.5	.4	.3	.1	.....	.....	.3	100.0	.....	17.5	17.5	16.3	13.7	15.0	12.5	2.5	.....	.....	5.0
Typhoid fever	.1	1.1	.9	.2	.2	.1	.1	.....	.....	.....	.2	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	.....	.....	.....	(2)
Multiple infectious diseases	.1	.4	.1	.....	.....	(1)	(1)	.....	.....	.....	.....	(2)	(2)	(2)	(2)	.....	.....	(2)	(2)	.....	.....	.....	.....
Other infectious diseases, specified	.6	1.8	.7	.6	.6	.4	.4	.3	.3	.3	.2	100.0	10.4	25.2	8.7	8.7	12.2	10.4	11.3	6.1	3.5	.9	2.6
Infectious diseases, not specified	2.5	4.9	2.8	2.9	2.5	2.7	2.5	2.1	1.2	.....	1.7	100.0	10.0	14.9	8.1	9.4	10.7	14.7	16.0	9.6	2.5	.....	4.1
Trauma	1.2	14.6	21.6	22.3	14.9	10.1	7.7	5.3	1.8	.4	4.5	100.0	1.2	11.3	15.7	18.8	16.5	14.1	12.6	6.1	1.0	(1)	2.7
Poisonings	.1	.2	.4	1.2	.8	.7	.6	.3	.2	.....	.3	100.0	1.0	3.0	5.9	19.8	18.8	18.8	19.8	6.9	2.0	.....	4.0
Neoplasms	.2	.4	1.3	1.4	.8	1.0	.5	.3	.....	.4	5	100.0	3.7	4.5	14.1	18.5	14.1	22.2	12.6	5.2	.....	.7	4.4

General diseases, not elsewhere classified	1.1	2.5	2.2	3.1	3.3	4.9	7.3	8.6	8.9	7.5	4.5	100.0	2.4	4.0	3.3	5.4	7.6	14.3	25.0	20.4	9.8	2.1	5.7
Anemia and other blood diseases	.....	.....	.1	.....	.1	.1	.1	(1)	.....	.....	.....	(2)	.....	.....	(2)	.....	(2)	(2)	(2)	(2)	.....	.....	.....
Diabetes	(1)	.3	.1	.5	.8	1.4	3.5	2.9	1.8	.....	1.5	100.0	.3	1.3	.3	3.0	6.3	13.5	39.9	22.5	6.6	.....	6.3
Nephritis and other kidney diseases	.....	.....	.1	.3	.3	.3	.4	.6	1.3	.....	.....	100.0	.....	.....	3.1	7.7	12.3	12.3	21.6	21.5	21.5	.....	.....
Vascular diseases	.3	.3	.3	.1	.4	1.6	2.4	4.3	5.0	6.8	1.3	100.0	1.7	1.2	1.5	.6	2.6	13.3	23.8	29.3	15.9	5.5	4.6
Diseases of the central nervous system	.6	1.4	.9	1.4	.7	.5	.3	.3	.1	.....	.2	100.0	9.8	18.8	10.7	19.7	12.3	13.1	6.6	5.7	.8	.....	2.5
Diseases of pregnancy and childbirth	.....	.....	.1	.3	.4	.1	.....	.1	.....	.....	.1	(2)	.....	.....	(2)	(2)	(2)	(2)	.....	(2)	.....	.....	(2)
Nutritional deficiency	(1)	.....	.....	.2	.1	.1	(1)	.....	.....	.....	.....	(2)	(2)	.....	.....	(2)	(2)	(2)	(2)	.....	.....	.....	.....
Other general diseases, specified	.2	.3	.4	.2	.4	.4	.3	.3	.3	.....	.9	100.0	5.3	8.0	8.0	5.3	12.0	16.0	14.7	10.7	4.0	.....	16.0
General diseases, not specified	.....	.2	.2	.1	.1	.4	.3	.1	.4	.7	.5	(2)	.....	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Prenatal origin, not elsewhere classified	51.7	13.5	8.7	4.9	5.0	3.2	2.3	1.1	.6	.4	8.3	100.0	56.0	11.0	6.8	4.4	5.9	4.8	4.0	1.3	.4	.1	5.3
Hereditary origin, established	3.8	1.1	.6	.4	.8	.2	.2	.1	.3	.4	1.1	100.0	48.5	10.2	5.4	4.2	10.7	3.6	4.8	1.8	1.8	.6	8.4
Hereditary origin, presumed	10.3	4.2	3.2	2.5	2.4	1.4	.8	.3	.....	.....	2.5	100.0	40.6	12.7	8.9	8.0	10.2	7.5	4.8	1.5	.....	.....	5.8
Prenatal origin, cause not specified	37.6	8.2	4.9	2.0	1.8	1.6	1.3	.7	.3	.....	4.7	100.0	63.7	10.5	6.0	2.9	3.4	3.7	3.6	1.2	.3	.....	4.7
Unknown to science	5.8	7.8	10.7	11.8	18.2	26.9	39.9	57.4	67.0	81.3	30.3	100.0	2.1	2.1	2.8	3.5	7.1	13.3	23.1	23.1	12.5	3.9	6.5
Undetermined by physician or not specified	14.0	21.1	23.8	22.5	25.6	24.7	21.8	14.8	14.4	7.9	34.1	100.0	6.7	7.7	8.2	8.9	13.4	16.4	16.9	8.0	3.6	.5	9.7

[1] Less than 0.05 percent. [2] Not computed; less than 50 recipients.

Appendix B.

NOTE ON AGE ADJUSTMENT IN APPENDIX TABLES A-6 AND A-11

As is pointed out in chapters III and IV, for a variety of reasons the study population contains a disproportionately small number of blind children and adolescents and of persons 65 years of age and over. The deficiencies in the number of persons under age 20 or over 65 are indicated graphically in chart 3 (page 28), in which comparison is made of the age distribution of recipients of aid to the blind and persons found blind in the National Health Survey.

Since the National Health Survey probably supplies the best available information concerning the age distribution of persons who are blind, its data have been used to correct or adjust the age distribution of the recipients of aid to the blind comprising the population of this study. In chart 3 the curve for the National Health Survey sample represents the persons found blind in that survey distributed by 5-year age intervals. The curve for recipients of aid to the blind represents the corresponding distribution of the study population. The two curves are found to fit approximately for the ages from 20 to 65, and assumption is made that if there were no factors tending to exclude blind children and adolescents and aged blind persons from the aid to the blind rolls, the entire recipient curve would approximate that of the National Health Survey sample. On the basis of this assumption, a computation was made of the amount of probable deficiency in the age classes, under 20, 60–69, 70–79, and 80 and over. The total computed deficiency was about 9,400 persons, which when added to the number of recipients studied gives the adjusted total of about 30,000 persons that appears in tables A–6 and A–11.

Since certain eye conditions and etiologies are much more prevalent among persons of either the younger or older ages than of others, the fact that the survey sample contains too few young and too few old persons results in some distortion generally in the cause tabulations. The adjustment of the cause data for the age deficiency of the sample is made in the two tables in which causes are related to age. In these tables (A–6 and A–11) the percentage distribution of recipients by cause in age groups 60–69, 70–79, and 80 and over are those obtained from the original data. The cause data of these age groups, however, when combined with the data for all other age groups, are given the increased weights indicated by the adjusted totals for the respective age groups.

Inasmuch as the 101 recipients of aid to the blind under age 20 are too few to give a satisfactory indication of a probable distribution of causes for this age group, the distributions found in the tabulation of

causes of blindness among pupils in schools for the blind in the school year 1940–41 were used.[1] This distribution was then given weight in determining the total distribution corresponding to the adjusted number of recipients for this age group.

The first total column of tables A–6 and A–11 contains the percentage distribution of recipients by cause when the school data are substituted for those of the study for persons under 20, and when the cause distributions for the respective age classes are given weights corresponding to the assumed correct age distribution of all blind persons.

The latter half of each of these tables shows the percentage distribution by age of the adjusted numbers of recipients in each cause category.

[1] See footnote page 34.

Form RS-203.6
FEDERAL SECURITY AGENCY
SOCIAL SECURITY BOARD
DIVISION OF PUBLIC ASSISTANCE RESEARCH
May 1940

STUDY OF CAUSES OF BLINDNESS
AMONG RECIPIENTS OF AID TO THE BLIND

A STATE _____

B COUNTY _____

Name of recipient _____ (Last name) (First name) (Middle name)

C Case Number _____

Address _____ (Number) (Street) (City, town, or village)

DEF Date accepted for aid to the blind _____ (Month) (Day) (Year)

Code

_____ G Location of home in which recipient is living (circle one):

In urban area:

1 Incorporated place of 100,000 or more.

2 Incorporated place of 2,500–99,999.

In rural area:

Rural—nonfarm:

3 Incorporated place under 2,500.

4 Unincorporated place adjacent to a city of 50,000 or more.

5 Other unincorporated place.

6 Rural—farm.

_____ HI Date of birth _____ (Month) (Day) (Year)

_____ J Sex (circle one):

1 Male.

2 Female.

_____ K Race (circle one):

01 White.

02 Negro.

03 Indian.

04–99 Other (specify) _____

_____ L Age at onset of blindness _____

Code

_____ M Eye condition: Site (topography) and type of affection (specify) _____

_____ N Eye condition: Etiology (specify) _____

_____ O Extent of vision (circle one):

10 Absolute blindness.

11 Light perception (and/or projection) only.

12 Motion perception and form perception up to but not including 5/200.

13 5/200 up to but not including 10/200.

14 10/200 up to but not including 20/200.

15 20/200.

Better than 20/200, with peripheral limitation indicated:

16 Peripheral field 20° or less.

17 Peripheral field greater than 20°.

18 Peripheral field limitation, amount not known.

20 Better than 20/200 up to and including 20/70 with no peripheral limitation indicated.

21 Better than 20/70 with no peripheral limitation indicated.

99 Not reported.

_____ P Recommendation for medical treatment to improve or conserve vision:

01 No.

Yes (circle each type recommended):

11 Operation on eye.

12 Treatment of eye.

13 Glasses.

14 Systemic treatment.

QRS Date of last eye examination _____ (Month) (Day) (Year)

Name of examining physician _____

Schedule completed by _____

Date _____

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